(2)

THE ART OF DRAWING IN PERSPECTIVE:

WHEREIN

The Doctrine of PERSPECTIVE is clearly and conciſely treated of, upon Geometrical Principles; and a Mechanical Method of PERSPECTIVE and DESIGNING invented, for the Benefit of ſuch as are Strangers to Mathematics.

To which are annexed,

The ART of PAINTING upon GLASS, and Drawing in CRAYONS, with Directions for making them after the *French* and *Italian* manner: Alſo the ART of ETCHING, and that of JAPANNING upon Wood, or any Metal, ſo as to imitate China; with Inſtructions for making Black or Gilt Japan ware, both beautiful and light; and for making the hardeſt and moſt tranſparent Varniſhes.

To which is added,

A Method of caſting AMBER in any Form whatever.

A NEW EDITION, Corrected,
And, beſides other Improvements, illuſtrated with
COPPER-PLATES.

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THE CONTENTS

Of the ſeveral ARTICLES contained in this Book.

PART I.

The principles, &c. of PERSPECTIVE.

Of Perſpective in general, — — Page 1
Definitions in Perſpective, —— 2
General Rules or Laws in regard to Preſpective, 5
Of Deſigning, — —— —— 8
The Foundation, Method, &c. of Perſpective, 14
Of the general Practice of Perſpective as it regards Drawing, —— —— 22
A mechanical Method of Perſpective, —— 26

PART II.

The Art of PAINTING *upon* GLASS, *&c.*

Of Painting upon Glaſs, —— —— 31
Materials proper for Painting upon Glaſs, 32
The manner of uſing the Colours in Painting upon Glaſs, —— —— —— — 38
Of the making of Crayons for dry Colouring, 40
Inſtructions for the Uſe of Crayons, —— 54
The Method of Etching, —— —— 55
Of the proper Inſtruments, Materials, and Method of preparing theſe Materials uſed in Etching, —— —— —— ibid.
The Method of preparing the Plate, and uſing the Varniſh for Etching, —— —— 60
General Directions for Etching, —— 62
Particular Directions for Etching, — — 65

Of Japan and Indian Varniſhes, — Page 70
Of Japanning of Metals, —— —— ibid.
The manner of japanning Iron Snuff-Boxes, &c. ſo as to look like China gilt about the Edges, 71
Method of making White or Amber-Varniſh, from a Manuſcript of Mr. Boyle, — 72
To japan Braſs, in the manner uſed to gild Braſs-buttons, ſo as to make them look like Gold, 74
Of japanning on Wood or Paper, with Directions for making ſeveral ſorts of Japan Wares, either in Gold, Silver, or in Colour, — 75
To make the ſtrong Japan-varniſh, — — 77
To make theſe Veſſels of a Gold-colour, —— 78
Varniſh for Gold, or ſuch leaf of other Metals as imitates Gold, —— —— 79
To make theſe paper, &c. Veſſels of a Red-colour with gilded Figures on them, —— 80
The Method of ſilvering theſe japan Veſſels, — 81
To make the Varniſh to cover the Silver, —— 82
Varniſh for japanning of Wood, to mix with ſeveral Colours, —— —— 83
Directions for imitating China or Porcelain Ware or Tea-Tables, &c. upon gold or ſilver Grounds, —— —— —— ibid.
The Method of glazing Prints with white Varniſh, ſo as to bear Water and a Poliſh, — 84
Directions for colouring of Draughts, or Prints of Birds, Flowers, &c. in japanning, — 87
General Obſervations in regard to Varniſhing, 89
Directions for taking off any Figure from China or Japan-ware, without any previous Knowledge in Drawing, — — — — 9
A Method, from Mr. Boyle, *of caſting Amber i any Figure whatever, with Flies or any ſmal Animals in it, in imitation of thoſe valuabl Pieces of Amber ſold at a high Price,* — 9

T H

THE
ART
OF
DRAWING,
IN
PERSPECTIVE, &c.

PART I.

The Principles, &c. of PERSPECTIVE.

CHAP. I.

Of PERSPECTIVE *in general.*

PERSPECTIVE is the Art of delineating Objects on a plane Surface, ſuch as they would appear at a certain Diſtance and Height, upon a tranſparent Plane placed perpendicular to the Horizon, between the Objects and the Eye.

Hence this Art is abſolutely neceſſary for ſuch as would thoroughly underſtand that of Drawing; and is of the greateſt conſequence in thoſe of Engraving, Etching, Carving, or Painting: yet perſpective of itſelf, connot be called a certain Rule in theſe Arts, but is to be uſed with Judgment and Diſcretion; for, being well underſtood, if it be applied too accurately, the practitioner may indeed effect ſuch things as are within the Rules of Art, yet the Work will not always have that agreeable effect, that natural excellency and ſimplicity, which a leſs rigorous obſervance of the Rules of this Art might produce: therefore the young Artiſt is to adhere to the precepts of perſpective, no farther than as it leads to the perfection of his Work, or Deſign; and when it is not uſeful to theſe purpoſes he is to neglect it, leſt it ſhould miſguide him, and lead him to ſomething repugnant to his peculiar Art.

CHAP. II.

DEFINITIONS *in Perſpective.*

1. THE horizontal Line is that Line ſuppoſed to be drawn parallel to the Horizon thro' the Eye of the Spectator; or rather, it is a Line which ſeparates the Heaven from the Earth, and which limits the Sight. Thus A, B, ſee the Plate Fig. 1, are two Pillars below the horizontal Line C D, by reaſon the Eye is elevated above them; in Fig. 2, they are ſaid to be equal with it; and in Fig. 3, raiſed above it. Thus, according

to the different Points of View, the Objects will be either higher or lower than the horizontal Line.

2. The Point of Sight A, Fig. 4, is that which makes the centrical Ray on the horizontal Line *a b*; or it is the Point where all the other viſual Rays D, D, unite.

3. The Points of Diſtance C, C, Fig. 4, are Points ſet off in the horizontal Line at equal Diſtances on each Side of the point of Sight A.

4. And in the ſame Figure B B repreſents the baſe-line, or fundamental Line.

5. E E is the Abridgment of the Square, of which D, D, are the Sides.

6. F, F, are the diagonal Lines which go to the Points of diſtance C, C.

7. Accidental points are thoſe where the Objects end: theſe may be caſt negligently, becauſe neither drawn to the point of Sight, nor to thoſe of Diſtance, but meeting each other in the horizontal Line. For example, Two pieces of ſquare Timber G and H, Fig. 5, make the Points I, I, I, I, on the horizontal Line; but go not to the Point of Sight K, nor to the Points of Diſtance C, C: theſe accidental points ſerve likewiſe for Caſements, Doors, Windows, Tables, Chairs, &c.

8. The

8. The Point of direct View, or of the Front, is when we have the Object directly before us; in which caſe it ſhews only the fore-Side; and, if below the Horizon, a little of the Top; but nothing of the Sides, unleſs the Object be polygonous.

9. The Point of oblique View, is when we ſee an Object aſide of us, and as it were aſlant, or with the Corner of the Eye; the Eye, however, being all the while oppoſite to the Point of Sight; in which caſe, we ſee the Object laterally, and it preſents to us two Sides or Faces. The Practice is the ſame in the ſide Points, as in the front Points; a Point of Sight, Points of Diſtance, &c. being laid down in the one as well as the other.

10. Ichnography is the Figure of the Platform in Perſpective, or the Plan any thing is to be raiſed upon.

11. Orthography in Perſpective is the Figure of the front or fore-Side of an Object, as an Houſe, &c. or it is the Figure of ſuch an Object directly oppoſite to the Eye. As the Ichnography repreſents the Plan, the Orthography repreſents the Side oppoſite to the Eye.

12. Scenography is what exhibits the Object quite perfect with all its Diminutions and Shadows, front, ſides, height, and all raiſed on the geometrical Plan.

CHAP.

CHAP. III.

General RULES, *or* LAWS, *in regard to Perſpective.*

LET every Line which in the Object or geometrical Figure is ſtraight, perpendicular, or parallel to its Baſe, be ſo likewiſe in its ſcenographic Delineations, or in the Deſcription thereof in all its Dimenſions ſuch as it appears to the Eye; and let the Lines which in the Object return at the right Angles from the fore-right Side be drawn in like manner ſcenographically from the Point of Sight.

Let all ſtraight Lines, which in the Object return from the fore-right Side, run in a ſcenographic Figure, into the horizontal Line.

Let the Object you intend to delineate, ſtanding on your right Hand, be placed alſo on the right Hand of the Point of Sight, and that on the left Hand, on that Hand of the ſame Point; as alſo that which is juſt before, in the middle of it.

Let thoſe Lines which, in the Object, are equi-diſtant from the returning Line, be drawn, in the ſcenographic Figure from that Point found in the Horizon.

In ſetting off the Altitude of Columns, Pedeſtals, and the like, meaſure the height from the baſe-line upward in the front or fore-right Side; and a viſual Ray down that point in the Front, ſhall limit the Altitude of the Column, or Pillar, all the way behind the front Side, or orthographic Appearance, even to the Point of Sight. This Rule muſt be obſerved in all Figures, as well where there is a Front or fore-right Side, as where there is none.

In delineating Ovals, Circles, Arches, Croſſes, Spirals, and croſs Arches, or any other Figure in the Roof of any Room, firſt draw ichnographically, and ſo, with perpendiculars from the moſt eminent Points thereof, carry it up to the Cieling, from which ſeveral Points carry on the Figure.

The Center in any ſcenographic regular Figure, is found by drawing croſs Lines from the oppoſite Angles, for the Points where the Diagonals croſs in the Center.

A ground-plane of Squares is alike, both above and below the horizontal Line, only the more it is diſtant either above or beneath the Horizon, the Squares will be ſo much the larger or wider.

In drawing a perſpective Figure where many Lines come together, you may, for the direct-ing of your Eye, draw the Diagonals in red, the viſual Lines in black, the perpendiculars in green, or other different Colour, from that which you intend the Figure ſhall be of.

Having conſidered the height, diſtance, and poſition of the Figure, and drawn it accordingly, with ſide or angle againſt the Baſe, raſe Perpendiculars from the ſeveral Angles or deſigned Points, from the Figure to the Baſe, and transfer the length of each perpendicular from the place where it touches the Baſe, to the Baſe on the Side oppoſite to the Point of diſtance, ſo will the Diametrals drawn to the Perpendiculars in the Baſe, by interſection with the Diagonals, drawn to the ſeveral transferred Diſtances, give the Angles of the Figures; and ſo Lines drawn from one Point to another, will circumſcribe the ſcenographic Figure.

If in a Landſkip there are any ſtanding Waters, as Rivers, Ponds, and the like, place the horizontal Line level with the fartheſt Sight or Appearance of it.

If there be any Houſes or the like in the Picture, conſider their poſition, that you may find from what Point in the horizontal Lines to draw the Front and Sides thereof.

In deſcribing things at a great Diſtance, obſerve the proportion, both in magnitude and diſtance,

tance, in the Draught, which appears from the Object to the Eye.

In colouring and ſhadowing of every thing, you muſt do the ſame in your Picture which you obſerve with your Eye, eſpecially in Objects lying near; but according as the Diſtance grows greater, ſo the Colours muſt be fainter, till at laſt they loſe themſelves in a darkiſh ſky-colour.

CHAP. IV.

Of DESIGNING.

THE Deſign is the firſt Idea of a large Work drawn roughly and in little, with an intention to be executed and finiſhed at large; and this Deſign, according to the Rules of Mathematicians, makes the Object of Perſpective.

The Art of Drawing or Painting has been by ſome of the greateſt Maſters divided into the Deſign, or Draught, the Proportion, the Expreſſion, the Claro obſcuro, the Ordonnance, the Colouring, and the Perſpective.

The Deſign is the ſimple Contour, or Outlines of the Figures intended to be repreſented, or the Lines that terminate and circumſcribe them: ſuch Deſign is ſometimes drawn in Crayons, or Ink, without any Shadows at all; ſometimes it is hatched, that is, the Shadows are expreſſed by ſenſible Out-lines, uſually drawn acroſs each other with the Pen, Crayon, or Graver. Sometimes again, the Shadows are done with the Crayon rubbed ſo as that there do not appear any Lines: at other times, the Grains or Strokes of the Crayon appear as not being rubbed: ſometimes the Deſign is waſhed, that is, the Shadows are done with a Pencil in Indian Ink, or ſome other Liquor; and ſometimes the Deſign is coloured, that is, Colours are laid on much like thoſe intended for the grand Work.

The eſſential Requiſites of a Deſign are Correctneſs, Taſte, Elegance, Character, Expreſſion, and Perſpective. Correctneſs depends on the juſtneſs of the proportions, and knowledge of Anatomy. Taſte is a certain manner of Correctneſs peculiar to one's ſelf, derived either from Nature, Maſters, or Studies, or all of them united. Elegance gives a Delicacy that not only ſtrikes Perſons of Judgment, but communicates an agreeableneſs that pleaſes univerſally. The Character is what is peculiar to each thing, wherein there muſt be diverſity, inſomuch that every thing has its peculiar Character to diſtinguiſh it. The Expreſſion is the Repreſentation of the parts of a Painting or a Figure, according to the Situation they are in with regard to the Point of Sight,

The Deſign, or Draught, is a part of the greateſt Import and Extent in Drawing. It is acquired chiefly by Genius and Application, Rules being of leſs avail here than in any other Branch of the Art, as Colouring, &c. The principal Rules that regard Deſign are, that Novices accuſtom themſelves to copy good Originals, at firſt ſight; not to uſe Squares in Drawing, leſt they ſtint and confine their Judgment; to deſign well from Life before they practiſe Perſpective; to learn to adjuſt the Size of their Figures to the viſual Angle, and the Diſtance of the Eye from the Model or Object; to mark out all the parts of their Deſign before they begin to ſhade; to make their Contours in great Pieces, without taking notice of the little Muſcles and other Breaks; to make themſelves Maſters of the Rules of Perſpective: To obſerve the Perpendicular, Parallel and Diſtance of every Stroke; to compare and oppoſe the parts that meet and traverſe the Perpendicular, ſo as to form a kind of Square in the Mind, which is the great, and almoſt the only Rule of Deſigning juſtly: To have a Regard, not only to the Model, but to the part already deſigned, there being no ſuch Thing as Deſigning with ſtrict Juſtneſs, but by comparing and proportioning every part o the firſt. All the other Rules relate immediately to Perſpective.

There are ſeveral Methods invented of deſigning mechanically. The following is the Method of the learned Sir *Chriſtopher Wren*, and may be put in practice with great eaſe. A, Fig. 6, is a ſmall Sight with a ſhort Arm, B, which may be turned round about and moved up and down the ſmall Cylinder C D, which is ſcrewed into the piece E D, at D: this piece E D moving round about the Center E, by which means the Sight may be removed either towards E or F. F F is a Ruler faſtened on the two Rulers G, G, which Rulers ſerve both to keep the ſquare Frame SSSS perpendicular, and by their ſliding through the ſquare Holes T, T, they ſerve to ſtay the Sight either farther from, or nearer to, the ſaid Frame; on which Frame is ſtuck on with a little Wax the paper OOOO, whereon the Picture is to be drawn by the Pen I. The Pen I is by a ſmall braſs Handle V ſo fixed to the Ruler H H, that the Point I may be kept very firm, ſo as always to touch the Paper. H H is a Ruler that is conſtantly by means of the ſmall Strings *aaa*, *bbb*, moved horizontally or parallel to itſelf; at the end of which is ſtruck a ſmall Pin, whoſe Head P is the Sight which is to be moved up and down on the Out-lines of any Object.

The Contrivance of the Strings is this: The two Strings *a a a*, *b b b*, are exactly of an equal length: two ends of them are faſtened into a ſmall leaden Weight, which is employed in a Socket on the backſide of the Frame, and ſerves exactly to counterpoiſe the Ruler H H, being of an equal Weight with it. The other two ends of them are faſtened to two ſmall Pins H H, after they have rolled about the ſmall Pullies M M, L L, K K, by means of which Pullies if the Pen I be taken hold of, and moved up and down the Paper, the String moving very eaſily, the Ruler will always remain in an horizontal Poſition.

The manner of uſing it is thus: Set the Inſtrument upon a Table, and fix the Sight A at what height above the Table, and at what diſtance from the Frame S S S S, you pleaſe. Then looking through the Sight A, holding the Pen I in your Hand, move the Head of the Pin P up and down the Out-lines of the Object, and the Point of the Pen I will deſcribe on the Paper OOOO, the ſhape of the Object ſo traced.

Another mechanical Method of Deſigning much practiſed, is by means of the Camera-obſcura; being a Machine that repreſents an artificial Eye, wherein the Images of external Objects are exhibited diſtinctly in their native Colours, either invertedly or erect. The Camera-obſcura, or darkened Room, is made after two different Methods, one, the Camera-obſcura, properly ſo called; that is, any large Room made as dark as poſſible, ſo as to exclude all Light but that which is to paſs through the Hole and Lens in a Ball fixed in the Window in the ſaid Room.

The other is made in various Forms, as that of a Box, whoſe ſides fold out, *&c.* for the Conveniency of carrying it from place to place.

For the Conſtruction of a Camera-obſcura, 1. Darken the Room F F, Fig. 7, leaving only one little Aperture open in the Window at V, on the ſide I K, facing the proſpect A B C D. 2. In this Aperture fit a Lens either plane-convex, or convex on both ſides. 3. At a due diſtance, to be determined by Experience, ſpread a Paper or white Cloth, unleſs there be a white Wall for the Purpoſe: Then on this G H, the deſired Objects A B C D will be delineated invertedly. 4. If you would have them appear direct, place a concave Lens between the center and the Focus of the firſt Lens, or receive the Image on a plane Speculum inclined to the horizon under an Angle of 45° or by means of two Lenſes, included in a Draw-tube inſtead of one. If the Aperture does not exceed the bigneſs of a Pen, the Objects will be repreſented without any Lens at all. And thus the Objects may be drawn or copied to the greateſt degree of Accuracy.

For a farther Explanation upon this Head, as alſo for ſeveral other mechanical Methods of taking Draughts, &c. we refer the curious and unexperienced Reader to *The Art of Drawing, and Painting in Water-Colours*

CHAP. V.

The FOUNDATION, METHOD, &c. *of Perſpective.*

PErſpective is either employed in repreſenting the Ichnographies, or Ground-Plot of Objects, or the Scenographies, or repreſentation of the Objects themſelves.

The Foundation of perſpective may be thus conceived; Suppoſe the Pentagon A B D E F, Fig. 8, were to be repreſented by the Rules of Perſpective on the tranſparent plane V P, placed perpendicularly on the horizontal Plane H R, dotted lines are imagined to paſs from the Eye C to each Point on the Pentagon, C A, C B, C D, &c. which are ſuppoſed in their paſſage through the Plane P V, to leave their Traces or Veſtiges in the Points *a*, *b*, *d*, &c. on the Plane, and thereby to delineate the Pentagon *a b d e f*, which, as it ſtrikes the Eye by the ſame Rays hat the original pentagon A B D E F does, will be a true perſpective Repreſentation of it.

The Buſineſs of perſpective therefore is to lay down geometrical Rules for finding the Points *a*, *b*, *d*, *e*, *f*, upon the Plane.

By the following Examples it will appear that he whole practice of Perſpective is built upon he Foundation already laid down.

Thus to find the perſpective Appearance of a Triangle, A B C, Fig. 9, between the Eye and he Triangle, draw the line D E, which is called he Fundamental Line; from 2 draw 2 V, repreſenting the perpendicular Diſtance of the Eye above the Fundamental Line, be it what it will; and through V draw, at right Angles to 2 V, H K parallel to D E: Then will the Plane D H K E repreſent the tranſparent Plane on which he Perſpective Repreſentation is to be made. Next to find the Perſpective Points of the Angles of the Triangle, let fall Perpendiculars A 1, C 2, B 3, from the Angles to the Fundamental D E; ſet off theſe Perpendiculars upon the Fundamental, oppoſite to the Point of Diſtance K, to B, A, C. From 1, 2, 3, draw Lines to he principal Point V; and from the Points A B, and C in the Fundamental Line, draw he right Lines A K, B K; C K to the Point of Diſtance K: which is ſo called becauſe the Spectator ought to be ſo far removed from the Figure or Painting, as it is diſtant from the principal Point V. The Points *a*, *b*, and *c*, where the viſual Lines V 1, V 2, V 3, interſect the Lines of Diſtance A K, B K, C K, will be angular Points of the Triangle *a b c*, the true Repreſentation of A B C.

By proceeding in this manner with the angular Points of any right-lined Figure, whether regular or irregular, it will be very eaſy to repreſent it in Perſpective: However, in practice, ſeveral compendious Methods will occur to every Artiſt.

Again, if, the ſcenographic Appearance of any Solid were to be repreſented; ſuppoſe of a triangular Priſm, whoſe Baſe is the Triangle *m n o*, Fig. 10, you need only find the upper Surface of it, in the ſame manner as you found the lower, or Baſe; and then joining the correſponding Points by right Lines, you will have the true Repreſentation of the Solid in Perſpective. So that the Work is the ſame as before; only you take a new Fundamental Line, as much higher than the former, as is the Altitude of that Solid whoſe ſcenographic Repreſentation you would delineate.

But there is ſtill a more commodious Way, which is this: Having found as above, the

Baſe or Ichnographic Plane *m n o*, let perpendiculars be erected to the Fundamental Line from the three angular Points, which will expreſs the Altitudes of thoſe Points. But becauſe theſe Altitudes, though equal in the Body or Solid itſelf, will appear unequal in the ſcenographic View, the fartheſt off appearing leſs than thoſe nearer the Eye, their true proportional Heights may be thus determined. Any where in the Fundamental Line, let A B be erected perpendicularly, and equal the true Altitude; or if the Figure has different Altitudes, let them be transferred into the perpendicular A B; and from the Points A and B, and from all the Points of intermediate Altitudes, if there be any ſuch, draw right Lines to the Point of Sight V: Thoſe Lines A V, B V, will conſtitute a Triangle with A B, within which all the Points of Altitude will be contained. Through the Points *o n m*, draw Parallels to the Fundamental Line; and from the Points *a a*, *&c.* erect perpendiculars to thoſe Parallels; and the Points where they interſect the Lines A V, B V, as in *a a*, *b b*, *&c.* will determine the apparent Height of the Solid in that ſcenographic Poſition to the Eye in V.

In practice, theſe Parallels and Perpendiculars are eaſily drawn, by means of a good Drawing-board, or Table, fitted for the Purpoſe.

To exhibit the Perſpective of a Pavement conſiſting of ſquare Stones viewed directly. Divide the Side A B, Fig. 11, transferred to the Fundamental Line D E, into as many equal parts as there are ſquare Stones in one Row. From the ſeveral points of Diviſion draw right Lines to the principal Point V, and from A to the Point of Diſtance K, draw a right Line A K, and from B to the other Point of Diſtance L, draw another] L B. Through the Points of the Interſections of the correſponding Lines draw right Lines on each ſide, to be produced to the right Lines A V and B V. Then will A *f g* B be the Appearance of the Pavement A F G B.

To exhibit the Perſpective Appearance of a ſquare A B D C, Fig. 12, ſeen obliquely, and having one of its ſides A B in the Fundamental Line. The ſquare being viewed obliquely, aſſume the principal Point V, in the horizontal Line H R, in ſuch a manner, as that a perpendicular to the Fundamental Line may fall without the ſide of the Square A B, at leaſt may not biſect it; and make V K the Diſtance of the Eye. Transfer the Perpendiculars A C and B D to the Fundamental Lines D E; and draw the right Line K B, K D; as alſo A V and V C: Then will A and B be their own Appearances; and *c* and *d* the Appearances of the Points C and D. Conſequently, A *c* *d* B is the Appearance of the Square A B D C.

If the ſquare A C B D be at a diſtance from the Fundamental Line D E, which yet rarely happens in practice, the Diſtances of the Angles A and B muſt likewiſe be transferred to the Fundamental Line; and even the oblique view itſelf is not very common.

The Reaſon why Objects appear the ſmaller as they are at the greater Diſtance is, that they appear according to the Angle of the Eye wherein they are ſeen; and this Angle is taken at the Eye, where the Lines terminating the Objects meet.

The Eye A, Fig. 13, for Inſtance, viewing the Object B C, will draw the Rays A B and A C which give the Angle B A C; ſo that an Object viewed under a greater Angle, will appear larger, and another under a leſs Angle ſmaller: For that among equal Objects, thoſe at the greateſt Diſtance appear ſmalleſt; and conſequently, that in all perſpective the remoteſt Objects, muſt be made the ſmalleſt, will be manifeſt from the Figure: the Objects B C, D E, F G, H I, and K L, being all equal, but at different Diſtances from the Eye, it is evident that the Angle D A E is leſs than the Angle B A C, that F A G is leſs than D A E, D A E, that H A I is leſs than F A G, and that K A L is leſs than H A I. Hence the ſecond, third, fourth and fifth Objects will appear ſmaller and ſmaller, though really all equal, inaſmuch as the Angles diminiſh in proportion as the Objects recede.

If the Eye, on the other hand, were removed to M, K L would appear the largeſt, and B C no bigger than N O.

Hence it follows, that, as Objects appear ſuch as is the Angle they are ſeen under, if ſeveral Lines be drawn between the ſides of the ſame Triangle, they will all appear equal: Thus all the Lines comprized between the ſides O N and O P, Fig. 14, of the Triangle N O P, will appear equal to each other; and as Objects comprehended under the ſame Angle ſeem equal, ſo all comprehended under a greater Angle muſt ſeem greater, and all under a ſmaller Angle, leſs.

Thus much being premiſed, if there be a number of Columns or Pilaſters to be ranged in perſpective on each ſide of a Hall, Church, or the like, they muſt of neceſſity be all made under the ſame Angle, and all tend to one common Point in the Horizon O, Fig. 15. For inſtance, If from the Points D E, the Eye being placed at A, and viewing the firſt Object D E, you draw the viſual Rays D O and E O, they will make the Triangle D O E, which will include the Columns D E, F G, H I, K L, M N, ſo as they will all appear equal.

What has been ſaid of the Sides is likewiſe to be underſtood of the Cielings and Pavements; the Diminutions of the Angles of remote Objects placed either above or below, following the ſame Rule as thoſe placed laterally. Trees being ranged by the ſame Law have the ſame effect as the Columns, *&c.* for being all comprehended in the ſame Angle, and the two Rays having each its own Angle, and all the Angles meeting in a Point, they form a third, which is the Earth, and a fourth which may be ſuppoſed the Air, and thus afford an elegant Proſpect.

To exhibit the Perſpective of a circle, 1. If the Circle be ſmall, circumſcribe a ſquare about it: Draw Diagonals and Diameters *b a* and *de*, Fig. 16, interſecting each other at right Angles; and draw the right Lines *f g* and *b c* parallel to the Diameter *de* through *b* and *f*; as alſo through *c* and *g* draw right Lines meeting the Fundamental Line in the Points 3 and 4. To the principal Point V draw right Lines V 1, V 3, V 4, V 2, and to the Points of Diſtance L and K draw the right Lines L 2 and K 1. Laſtly, connect the Points of interſection *a*, *b*, *d*, *f*, *b*, *g*, *e*, *c* with the Arches *a b*, *b*, *d d*, *f*, *&c*. Thus will *a b d f b g c a* be the Appearance of the Circle.

If the Circle be large, on the middle of the Fundamental A B, Fig. 17, deſcribe a ſemicircle, and from the ſeveral Points of the Periphery C, F; G, H, I, &c. to the Fundamental Line, let fall Perpendiculars C 1, F, 2, G 3, H 4, I 5, &c. From the Points A, 1, 2, 3, 4, 5, &c. draw right Lines to the principal Points V; as alſo a right Line from B to the Point of Diſtance L, and another from *a* to the Point of Diſtance K. Through the common Interſections draw right Lines as in the preceding Caſe: Thus we ſhall have the Points *e*, *f*, *g*, *h*, *c*, which are the Repreſentations of theſe A, C, F, G, H, I, which being connected as before, give the Projection of the Circle.

Hence appears not only how any curvilinear Figure may be projected on a Plane, but alſo how any Pavement conſiſting of any kind of Stones may be delineated in Perſpective.

CHAP. VI.

Of the general PRACTICE *of Perſpective as it regards Drawing.*

THE practical Part of Perſpective is only the Application of theſe Rules to the actual Deſcription of Objects. But as this Part is purely Mathematical, its Aſſiſtance towards

Drawing is only what can be performed by Rule and Compaſs, and can therefore ſtrictly ſerve only for finding the Images of Points of which they are compoſed; and as theſe are infinite, it is endleſs to find them all by the ſtrict Rules: Whence it becomes neceſſary after a ſufficient number of them are found, to complete the Image by the Help of Drawing; to the better effecting of which theſe Points ſerve as a Guide. Thus when a Circle is to be deſcribed, the practical Rules ſerve to find a ſufficient number of Points in the Circumference, which, being neatly joined by Hand, will perfect the Image ſo that, in ſtrictneſs, nothing in this Image is found by Mathematical Rules ſave the few particular Points; the reſt owes its being to the Hand of the Drawer.

Thus alſo, if any complicated Figure be propoſed, it may not be eaſy to apply the practical Rules to the deſcription of every minute Part; but by incloſing that Figure in a regular one properly ſubdivided, and reduced into perſpective, that will ſerve as a Help, whereby a perſon ſkilled in drawing may with eaſe deſcribe the Object propoſed. Upon the whole, where the Boundaries of the propoſed Objects conſiſt of ſtraight Lines and plain ſurfaces, they may be deſcribed directly by the Rules of Perſpective: But when they are curvilinear, either in their Sides or Surfaces, the practical Rules can only ſerve for the Deſcription of ſuch right-lined

Caſes as may conveniently incloſe the Objects, and which will enable the Deſigner to draw them within thoſe known Bounds with a ſufficient degree of exactneſs.

It is therefore in vain to ſeek by the practical Rules of Perſpective to deſcribe all the little Hollows and Prominencies of Objects; the different Light and Shade of their Parts; or their ſmaller Windings and Turnings; the infinite Variety of the Folds in Drapery; of the Boughs and Leaves of Trees; or the Features and Limbs of Men and Animals; much leſs to give them that Roundneſs and Softneſs, that Force and Spirit, that Eaſineſs and Freedom of Poſture, that Expreſſion and Grace, which are requiſite to a good Picture: For the Rules deſigned to anſwer theſe Purpoſes, the Reader is deſired to conſult *The Art of Drawing*, already referred to.

Perſpective, then, muſt content itſelf with its peculiar Province of exhibiting a kind of Rough-draught to ſerve as a Ground-work, and to aſcertain the general Proportions and Places of the Objects, according to their ſuppoſed Situations, leaving the reſt to be finiſhed, beautified, and ornamented by a Hand ſkilful in Drawing.

It is true, Perſpective is of moſt uſe where it is moſt wanted, and where a Deviation from its Rules would be moſt obſervable, as in deſcribing all regular Figures, Pieces of Architecture, and other Objects of that ſort, where the particular Tendency of the ſeveral Lines is moſt remarkable: The Rule and Compaſs, in ſuch Caſes, being much more exact than any Deſcription made by Hand: But ſtill the Figure deſcribed by the Perſpective Rules will need many Helps from Drawing: The Capitals and other Ornaments of Pillars, and their Entablatures, the Strength of Light and Shade, the apparent Roundneſs and Protuberance of the ſeveral Parts, muſt owe their Beauty and finiſhing to the Deſigner's Hand: But with regard to ſuch Objects as have no conſtant and certain determinate Shape or Size, ſuch as Clouds, Hills, Trees, Rivers, uneven Grounds, and the like, there is a much larger Latitude allowable, provided the general Bulk, or natural Shape of thoſe Objects be in ſome meaſure obſerved, ſo as not to make them appear unnatural or monſtrous.

But although the ſtrict practical Rules of Perſpective are in a great Meaſure confined to the Deſcription of right-lined Figures, yet the Knowledge of the general Laws of that Science is of great and neceſſary uſe to inform the Judgment after what manner the Images of any propoſed Lines ſhould run, which way they ſhould tend, and where terminate; and thereby enables it the better to determine what appearance any Objects ought to put on according to their different Situations and Diſtances; it accuſtoms the Eye to judge with greater Certainty of the Relations between real Objects and their perſpective Deſcriptions; and the Hand to draw the ſame accordingly; and directs the Judgment readily to diſcover any conſiderable Error therein, which might otherwiſe eſcape notice. Beſides that, when the Ground or general Plan, and the principal Parts of a Picture are firſt laid down according to the Rules, every thing elſe will more naturally fall in with them, and every remarkable Deviation from the juſt Rules will be the more readily perceived, and the eaſier avoided or rectified; ſo that altho' it may be infinitely tedious or abſolutely impracticable to deſcribe every minute Part of a Picture by the ſtrict mechanical Rules, yet the employing them, where they can be the moſt commodiouſly uſed, will give the Picture in general ſuch a Look as will guide the Artiſt in Drawing the other Parts, without any obvious Inconſiſtency.

CHAP. VII.

A mechanical Method of PERSPECTIVE.

FOR the Benefit of ſuch as are unacquainted with Mathematics, we propoſe to lay down the following Directions, whereby they may lay any Plan in Perſpective, and raiſe Pillars or Buildings, to due Heights, according to their proper Diſtances.

Suppoſe, LLDBA, Fig. 18, a ſquare Piece of Pavement, conſiſting of twenty-five Pieces of Marble, each a Foot ſquare: It muſt be meaſured exactly, and laid regularly down upon Paper; and for the ſake of a more diſtinct Notion how every particular Square will appear when you have a true perſpective View of them, mark every other Stone or Marble black, or elſe number each of them as in the Figure, which is divided into Squares, every other one of which may be made to appear black, like the three at the bottom marked B C D: or 1 2 3 4 5 anſwering to thoſe which are marked in Perſpective with the ſame Numbers.

Now to lay your Plan in Perſpective, fix your point of Sight as you obſerve in the Figure; or more or leſs to the right or left, as you think proper: Then draw the Line K K parallel to, and at what Diſtance you will from L L; and raiſe a Line on each ſide from L to K, to form the Figure you ſee, as a Frame to your Picture; then draw a Line from the Corner K, which is the point of diſtance, to the oppoſite corner L; and this Line will regulate your work. Thus far done, draw Lines from the Squares of your plan to the point of Sight, as exact as poſſible; and wherever your Line of

Diſtance cuts thoſe Lines, there draw Lines parallel to the Line L L, which will give you the Squares in Perſpective, or the true Figure of every Square : Thus D in the Perſpective plan anſwers to D in the meaſured plan, and 1, 2, 3 and 4, anſwer to their correſponding Squares in the ſame plan.

Now it remains to direct you how to raiſe either Pillars, Trees, Houſes, or any other Bodies, according to their reſpective Heights, at different Diſtances and Proportions, on the plan you have laid down.

Having your plan meaſured out in Perſpective into Squares of a Foot, or any other meaſure, let one of theſe Squares, 1 4 in Fig. 19. ſerve for the Baſe of a Pillar a Foot thick. Mark the Line L K, by the Scale of the Ground-plan, into equal proportions or Feet, *a*, *b*, *c*, *d*; which being ſo many Feet high, and ſtanding on the Baſe, are Uprights, not in perſpective. Then draw a Line, 4 5 parallel to 1 *c*. Join *c* and 5, and then you have the Front of a Body three Feet high and one Foot wide, being that which you were to raiſe. From 4 draw a Line, with a Black-lead Pencil, to the point of Sight; and from 3 raiſe a Line parallel to 4 5, till it touches the penciled Line, paſſing from 5 to the point of Sight, which will give you the ſide Appearance of the Column or Body, as you will ſee it from the place where you ſtand.

Then, with a Pencil, from *c* draw a Line to the Point of Sight, which will determine the Line 6 7 that bounds the Perſpective View of the Column a-top. Afterwards from 2 raiſe a penciled Line parallel to *a c* or L *c* till it touches the Line drawn from *c* to the Point of Sight; draw then 6 7 parallel to *c* 5, and you will have the Square of the Top of the Column, as obſerved from A, which is ſuppoſed to be the Place where you ſtand.

It is to be obſerved, that the Line drawn from 2 to 6 is only an imaginary Line, and in conſequence is to be rubbed out, becauſe not being ſeen from the Place where you ſtand, it muſt not appear in the Drawing. The ſame may be underſtood of the Line drawn from 1 to 2; but it is neceſſary that they appear in the Draught, on account that they direct you how to regulate the top of your Column, and to place it with certainty upon its Baſe.

Laſtly, finiſh your Column with Lines only, that is from 1 to *c*, from 4 to 5, from 3 to 7, from *c* to 5, from 6 to 7, and from 1 to 4, whereby you will have the true Repreſentation of the Column, as in Fig. 20.

When this is done, you may erect another Column on any one of the Squares in the ſame manner, obſerving to fling your Shades all on one ſide, and being able to maſter theſe few Examples, which may coſt you very little trouble, you will be capable of doing any thing in this way.

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PART II.

The Art of PAINTING *upon* GLASS, *&c.*

CHAP. I.

Of Painting upon GLASS.

PAINTING upon Glaſs is an Art which has generally appeared ſo difficult that few have ſucceeded in the Attempt, and yet there is no repreſentation of any Portrait can appear more elegant than in a Picture done well in this manner. For here there is all the Softneſs and Tenderneſs that can be deſired in a Picture; and it is eaſy to work, as there are no Out-lines to draw, nor any Shades to make, but the Colours are put on without the trouble of either.

The Pictures which are uſed on this Occaſion are thoſe done in Metzotinto; for their Shade being rubbed down with an Inſtrument on the Copper-plates, the ſeveral Lines which are drawn to repreſent the ſhady part of any common print are, by this means, joined together, and appear as ſoft and united as in any piece done with Indian Ink.

Being provided with ſuch Prints as you like, cut off the paper of the Margin, ſo that none be left but the print itſelf: then taking ſome of the fineſt Crown-glaſs, have it cut exactly to the Size of your Prints; and having well cleaned the Glaſs, lay ſome Venice Turpentine, as thin as poſſible, on one ſide thereof, with a Bruſh made of Hog's Hair; and if you perceive the Turpentine to lie unequally, paſs a piece of Wood made like a flat Ruler over it, till it lies equal in every part: then wet the Back of your print with a Sponge dipt in Water, and lay it with the picture Side next the Turpentine upon the Glaſs; taking care that every part of it lie cloſe to the Glaſs, and that there are no Bubbles, nor Bliſters to be ſeen: then you may roll it over with a wooden Roller made like a Cylinder, of two Inches diameter, to fix it cloſe to the Glaſs. When this is done, wet the Back of your print with a Sponge as before, till the paper will rub off with your fingers: then rub it gently till there remains only the picture on the Glaſs, and thus you will have all the Lines and Shades very viſible; and as if it was a fine Drawing in Indian Ink. Then let it remain till the next Day to dry; for otherwiſe the Colours will not take, becauſe they are ground in Oil.

MATERIALS *proper for Painting upon Glaſs.*

The ſeveral Sorts of Colours ground in Oil for this purpoſe, and tied up in little Bladders may be had at moſt Colour-ſhops. Of theſe you are to provide as follows:

WHITES.

Flake-white.
White-lead.

YELLOWS.

Engliſh Pink.
Yellow Oker.
Dutch Pink.
Yellow Orpiment.

REDS.

Roſe Pink.
Vermilion.
Red-lead.
Indian Red.
Lake.
Carmine.

BLUES.

Ultramarine.
Blue-bice.
Verditer.
Pruſſian Blue.
Saunders Blue.
Indigo.

BLACKS.

Lamp-black.
Ivory-black.

GREENS.

Verdigriſe diſtilled.
Verdigriſe and Yellow Oker mixt.
Verdigriſe and Engliſh Pink mixt.
Verdigriſe and Dutch Pink mixt.

BROWNS.

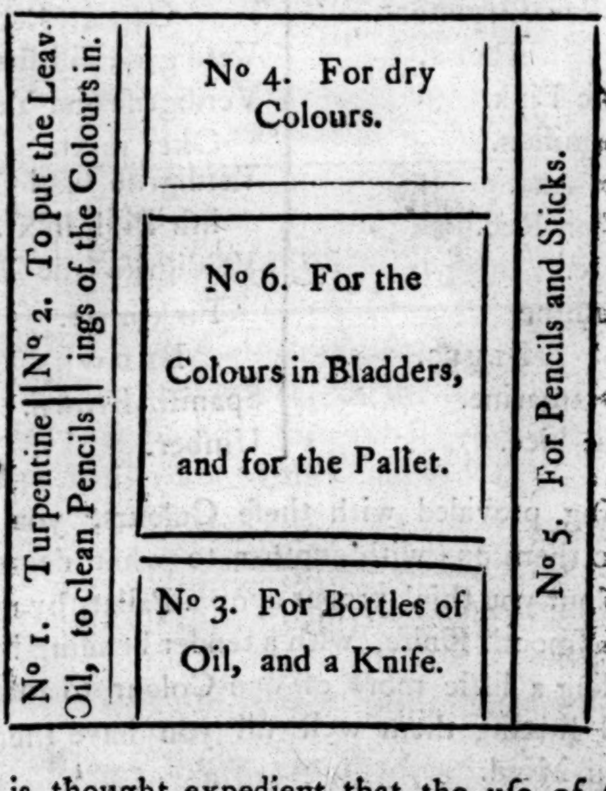
Spaniſh-Brown.
Umber.

Being provided with theſe Colours, you may mix them one with another to what degree of Colour you think proper upon a Pallet, by means of a ſmooth Knife, with a tender bending Blade, adding a little more of one Colour to another, and mixing them well till you have them to your Mind.

To get the Colour out of the Bladders, prick a Hole at the bottom of each Bladder you deſign to uſe, and preſs the Bladder till you have Colour enough upon your Pallet only for the preſent Uſe;

Uſe ; for in a Day's time the Colours will dry and can never be recovered.

For Painting upon Glaſs, the Artiſt is directed to provide himſelf with a Box about two Feet and a half long, five Inches high, and ſixteen wide, with Partitions in it as follows.


Nº 1. Turpentine Oil, to clean Pencils
Nº 2. To put the Leavings of the Colours in.
Nº 4. For dry Colours.
Nº 6. For the Colours in Bladders, and for the Pallet.
Nº 3. For Bottles of Oil, and a Knife.
Nº 5. For Pencils and Sticks.

It is thought expedient that the uſe of this Box, which is to keep all the Materials requiſite for Painting upon Glaſs, together, and preſerve them clean, ſhould, along with the Uſe of theſe Materials, be particularly explained.

Nº 1. muſt be a Box of tinned Iron placed in the great wooden Box for holding Oil of Turpentine, to clean the Pencils after having done your Work.

In Painting you muſt take Care to uſe only one Pencil in a Colour; or to have a Pencil for each; and as ſoon as you have done uſing them for the Day, to clean them from the Colours, by dipping them into the Oil of Turpentine, and laying the hairy part of the Pencil upon the tinned Diviſion between Nº 1, and Nº 2, preſſing your Finger pretty hard upon the Hair, and drawing it four or five times over the Tin, by which means the Colours that come out of the Pencil will fall into the tin Box Nº 2, and the Pencils will be clean, and the ſeveral mixtures of Colours that fall there with their Oils will become a good Size for Gold.

Then lay your Pencils with their Sticks in the Box Nº 5, whereby they will be fit for uſe upon the next Occaſion. It is to be remarked that the Pencils ſhould be of two Sorts, that is, ſome of Camel's Hair, being ſuch as will come to a point, when the Colour is in them, and ſome dry Bruſhes of white Hair, to be uſed only for joining one Colour with another, when they are juſt laid on, in order that they may appear ſoft, and that the place where the Painter leaves off abruptly may not be diſtinguiſhed.

The Painter upon Glaſs ſhould at leaſt have three Dozen of Camel's Hair-pencils, with Sticks to each about ten Inches or a Foot long, made of Cedar or Brazil-wood; though ſome curious perſons have them turned in Ivory.

At N° 4, there ſhould be a caſe of wood divided into ſeveral parts for keeping your dry Colours in, ſuch as Carmine and Ultramarine with others to grind upon occaſion: Theſe Diviſions ſerve to keep the colours from mixing with each other, and thereby ſpoiling one another. The finer or richer Colours, ſuch as Ultramarine or Carmine may rather be bought thus in powder than ground in Oil, becauſe in that Caſe they are apt to dry by degrees and be loſt.

The method of grinding theſe in Oil is, to put a little of either of them upon a poliſhed Marble, and with a drop or two of Oil to mix them by means of a ſoft bladed Knife, and then lay it on your Pallet. It may be obſerved that a very little of either Ultramarine or Carmine will ſerve, becauſe the leaſt touch of either on the light Sides of your Drawing will give the Picture a caſt.

If you have occaſion to grind any other Colour coarſer than theſe in their powder, you muſt be provided with a Muller made of a very hard Stone and finely poliſhed; Porphyry made in the Shape of a Sugar-loaf is the beſt Sort of Muller, though

Marble is good, as is alſo any Stone that will bear a poliſh, and even Glaſs, Cryſtal, or any ſuch like Materials.

In grinding a large Quantity of Colours, you are to conſider that your Oil muſt be in proportion, and never ſo much as to overcome the Quantity of Colour, which in the Grinding you may obſerve will frequently turn from under the Muller; in that caſe ſcrape it up with a Knife, and place it under the Muller again till it is as fine as you deſire it. Then put it immediately into a piece of Bladder, after having firſt immerged the Bladder in Warm-water, to ſoften it; then tie it up, and let it remain to be uſed as directed underneath.

Let the partition, No 3, be lined with Tin or tinned Iron, becauſe it is to encloſe the Bladders of Turpentine and Linſeed Oil, as alſo thoſe of Nut and burnt Oil, which you ſhould always keep by you: and which, in the taking in and out, would greaſe and ſtain the Wood; whereas the Tin will preſerve it from any ſtain from the Oil.

No 6, which is in the middle of the Box, ſhould alſo be made of Tin or tinned Iron, to take in and out at pleaſure; becauſe it is to contain all the Bladders of oiled Colours; and as ſome of them will frequently be uſed, the place for keeping them muſt otherwiſe become greaſy. Over theſe ſhould be laid the Pallet, which, every Night after having done your Work, ſhould be cleaned from the Colours put upon it; or elſe covered with its Colours in Water till the next Day. To keep your Pallet clean, rub it with Oil of Turpentine and a coarſe linen-cloth; and afterwards with Nut or Linſeed-oil, till it is dry.

But take what care you will of your Oil-colours in ſmall quantities, when they are expoſed to the Air, there will be a Coat, or thick hard Cruſt over them in a Day or two, which indeed may be taken off with a Knife, but yet much of the Colour will be loſt. After this Cruſt is taken off, the reſt of the Colours will be fit for uſe; and if it is too thick, you may put a Drop or two of Linſeed-oil to it, and mix it well with a tender bladed Knife. Some People in uſing Ultramarine and Carmine, on account of their great price, only put a Drop of Oil upon their Pallet, and put as much Colour to it as they think will be ſufficient; thus working them together with a Knife, which is, without doubt, more ſaving than to mix it on a Stone.

The manner of uſing the COLOURS *in Painting upon* GLASS.

AS the Lines and Shades of your picture happen to open, ſo you ought to diſpoſe your Colours;

lours; that is, lay the lighter Colours firſt on the lighter places of your prints, and the darker over the ſhaded places; and if you have once laid on the brighter Colours, it is no great matter whether the darker ſorts are laid a little over them; for the firſt Colour laid on will hide thoſe laid on afterwards. As for Example,

YELLOWS.

The lighteſt Yellow may be laid on firſt, and the Dutch Pink will ſhade it.

REDS.

The Red-lead may be laid on firſt, as the brighteſt Red Colour; and to ſhade it with Lake or Carmine will bring your picture to a beautiful Scarlet, equal to the fineſt Tincture of the Dye of Cochineal.

BLUES.

Lay on firſt the Blue bice, and ſhade it with Indigo; or elſe take Ultramarine and lay it on in the lights, and ſhade it with Indigo.

GREENS.

Lay on firſt ſome Verdigriſe, and then a mixture of that and Dutch Pink; and you may make this Green as Yellow as you deſire it, by adding more Dutch Pink as you ſee occaſion.

Let it be remembered, that, when any of the Colours are too ſtrong, they may be lightened to any degree, by mixing White with them upon your Pallet; or you may, on the other hand, darken them as much as you think fit, by mixing them with deeper Colours.

Having painted your Glaſs it muſt ſtand to dry for three or four Days, before it be fit to put in a Frame.

CHAP II.

Of the making of CRAYONS *for dry-colouring.*

THE Uſe of Crayons for dry-colouring is ſo neceſſary in taking Views and proſpects, and there are ſo few Crayons that are good of the ſort, that the way of making them is thought a neceſſary Article to be known by every one who is a Lover of Drawing and Painting.

WHITE.

As to White we have no occaſion for any other than that of white ſoft Chalk, which ſhould be ſawed into lengths of an Inch and a half, or two Inches; and there are little Saws made on purpoſe for ſuch uſes, about four Inches long and very thin.

When you have ſawed your Crayons of Chalk, which ſhould be at moſt a quarter of an Inch thick, round off the Corners with a Penknife;

and point them, by drawing your Penknife upwards from the place where the point is to be. You ought to have a Dozen or two of theſe, to be in a caſe by themſelves; or they will be diſcoloured by the other Colours.

YELLOW PASTILS, or CRAYONS.

Yellows come next, which ſhould be divided into four or five degrees of Colour.

Firſt Yellow. Take ſome Grounds of Starch and Flower of Brimſtone, mix them well with a Knife upon a poliſhed Marble, ſo that they produce the Colour of Straw, or ſuch a Yellow as will ſhew itſelf faintly; then pour a little Milk to them, or a little pale Ale-wort, till the Colour becomes like a paſte; then ſpread the paſte on a ſmooth piece of Chalk, with a broad Knife, till it is about the third part of an Inch thick, and let it lie till it is half dry; then with a ſharp Knife cut it in lengths of an Inch and a half, about the fourth part of an Inch wide, and roll it thin between two little pieces of Board, till it is round like a Straw, and point it as is directed for the Chalk. If you pleaſe you may uſe ground Chalk inſtead of Grounds of Starch.

Second Yellow. This is made of yellow Oker, ground well with fair Water, and then dried and beat. Mix it with ground Chalk, in ſuch a quantity as that it may be a little deeper than the former Colour, and mix this up with pale Ale-wort, in which a little white Sugar-candy may be diſſolved; and make theſe into Crayons as the former.

Third Yellow. Grind yellow Oker with Water, with a Stone and Muller, and when it is dry, beat it very fine, and make it into paſtils or Crayons, with pale Ale-wort, or Size made with Glover's Leather, boiled in Water till it comes to a Jelly; uſe it as before directed, and roll the paſtils between two Boards.

Fourth Yellow. Take Engliſh Pink, grind it as the former with Water, and when it is dry, beat it fine, and mix it with a very little ground Chalk, till it is deeper than the former Colour; then put to it ſome wort of pale Ale, and ſtir all well together, and make it into paſtils or Crayons, by rolling it in the foregoing manner.

Fifth Yellow. Engliſh Pink is to be ground as the former, and to be made into paſtils or Crayons by itſelf, with pale Ale-wort.

Sixth Yellow. Dutch Pink is to be uſed as the former, and mixed with pale Ale-wort, or Milk, is to be rolled and dried.

Seventh Yellow. Orpiment is one of the moſt poiſonous Colours that can be uſed; however it is one of the moſt beautiful ſort, and is next to Orange colour. This muſt have a little ground Chalk mixed with it, well tempered together, and made up with pale Ale-wort, with a little Gum-dragon diſſolved in it; and then rolled up into paſtils like the former.

ORANGE-COLOURS.

Firſt Orange-colour. Take yellow Orpiment, mix it with pale Ale-wort, and when it is in paſte roll it, and make it into paſtils or Crayons.

Second Orange-colour. Take Orpiment and Red-lead, (let the Red-lead be very finely ground in Water, and dried) then mix a little of this with your Orpiment, till you have the Colour you deſire; and putting in it ſome Ale-wort, wherein ſome Gum-dragon has been diſſolved, make it into a paſte, and roll into paſtils or Crayons.

Third Orange-colour. Take Engliſh Pink, grind it well, and put to it as much Vermilion as will make it of the Colour you deſire; mix theſe up with Ale-wort, that has been boiled till it is more glutinous than ordinary, and make it into paſtils or Crayons as before.

Fourth Orange-colour. Take Engliſh Pink, finely ground, and put to it as much Red-lead, well ground, as will make it agreeable to your deſign, mix theſe well with Ale-wort boiled to a thickneſs, and make them into Crayons.

Fifth Orange-colour. Take ſome Dutch Pink, well ground, and mix it with ſome Red-lead finely powdered, to the Colour you want; then with Ale-wort, or Milk, make it into a paſte, and make that into paſtils as before.

Take care in the mixture of theſe Colours that they have as many different Shades as poſſible.

REDS.

Firſt Red. Take Red-lead, grind it well with Water, then dry and beat it to a fine powder, and put to it ſome Chalk or White-lead finely ground to brighten it; mix this with Ale-wort, wherein a little Gum-dragon has been boiled, make it into a paſte, and roll it into Crayons. Of this your paſtils ſhould be made ſome deeper, others paler.

Second Red. Take Red-lead, and grind it well with a Marble and Muller, make it into a paſte with Ale-wort, in which Gum-dragon has been boiled.

Third Red. Red-oker wants no preparation, but ſawing, as directed for Chalk, in the firſt Article.

Fourth Red. Take Vermilion, ground fine, and mix it with ſome fine-Chalk, or White-lead, well pulverized; divide the compoſition into three parts, and by adding more of the White to one than another, you may make three different Colours, then put Ale-wort boiled thick to each, and make them ſeverally into paſte, and then into paſtils.

Fifth Red. Take Vermilion, grind it well, and mix it with Ale-wort, that hath been boiled to a thickneſs with Gum-dragon, till it is a paſte, then roll it into Crayons or Paſtils.

Sixth Red. Take ſome good Lake, well ground with Water upon a Marble, and when it is well dried and powdered, divide it into three parcels, and mix with each as much Chalk or White-lead ground fine, as will make them of different Colours, then work them ſeverally into paſte, and afterwards into Crayons.

Seventh Red. Take fine Lake, and reduce it to as fine Powder as you can, with Water; and when it is dry, and again finely powdered, mix it with Ale-wort, and make it into Paſtils or Crayons.

Eighth Red. Take Indian Red, grind it well with Water, and dry it like the other Colours; then mix it with Ale-wort that has been boiled to a thickneſs with a little Gum-dragon. This alone will be a very ſtrong Colour; but you ſhould mix ſome of it with White in two or three different manners, to be Shades to one another.

Ninth Red. Take Roſe Pink, and cut it into the Shape of Crayons, without any preparation. Carmine may be too dear for them, for a Shilling's worth would make but a very ſmall Crayon.

PURPLES.

Firſt Purple. Take Roſe Pink finely ground and powdered, mix it well with a little Saunders-blue, till the powder appears of the Colour you deſire it; then make it into paſte with Ale-wort thickened with Gum dragon, and roll it into the Figure of Crayons.

Second Purple. Take Lake finely ground and waſhed, put it to as much Blue-bice as is ſufficient to make it of a reddiſh Purple; and vary this in two or three manners, each lighter than the other. In the lighter Sorts, put a ſufficient quantity of Chalk, or White-lead well ground, and mix them up with Ale-wort boiled to a thickneſs with Gum-dragon, and roll them into Paſtils.

Third Purple. Take ſome Lake well ground, and add to it as much Pruſſian Blue as will make it of the Colour you deſire; mix theſe very well together in ſeveral parcels, making ſome more inclined to Red than the others; and to the fainteſt Purple of them add ground Chalk at pleaſure; and make theſe ſeverally into paſte with Ale-wort thickened by boiling, ſo make them after the ſame manner as the former into Paſtils.

BLUES.

Firſt Blue. Blue bice is the lighteſt Blue-colour that is uſed, it muſt be well ground with common Water on a fine Marble; and allowing it to dry, reduce it again to powder, afterwards lay it in four parcels, and to three of them put ſome Chalk, or White-lead, in different proportions, ſo that when they come to be mixed every one may be lighter than the other. Mix theſe ſeparately with Ale-wort thickened with Scraps of Glover's Leather; and after being in paſte to your mind, make them into Crayons. The fourth part of the Blue-bice muſt be made up by itſelf in the like manner.

Second Blue. Take Verditer well ground on a fine Marble, lay it in four parcels, and mix one of them purely with a thin Size made of Glover's Shreds and Ale-wort, and mix the other three parts with ſeveral proportions of Chalk, or White-lead, well ground, ſo as to make Shades to one another; make theſe into paſte with Ale-wort thickened with Gum-dragon, and then into Crayons.

Third Blue. Take ſome Pruſſian Blue well ground, lay it in four parcels on your Marble, and with three of them mix ſome Chalk, or White-lead well ground, to make them of different degrees of Colour, and the fourth muſt be alone. Make the three mixed Colours, into a paſte with pale Ale-wort boiled till it thickens; and the plain Colour into a paſte with Ale-wort boiled and thickened with Shavings of White-leather from the Glovers. Make all theſe into Paſtils.

Fourth Blue. Take Rock-indigo well ground with Water on a Marble; dry it, and reduce it to powder a ſecond time; then divide it into parcels as before, and with two or three parts of theſe parcels mix different proportions of ground Chalk, or White-lead ground, to make them deeper or paler, and let one part be the ſimple Colour. To the mixed Colours put ſome Ale-wort thickened with boiling; and mix them to Paſtes, and then make them into Paſtils.

As for the plain Indigo mix it with Ale-wort thickened by boiling with Glover's Shreds of white Leather, and then make it into Crayons.

BLACKS.

Firſt Black. The Black commonly uſed as a Crayon is Charcoal cut into lengths; the ſofteſt and beſt is that made of Willow. You ſhould have a Dozen of theſe at leaſt, becauſe Black and White are much more uſed than any other Colour.

Second Black. Take Ivory-black ground very fine with common Water, and add to it a very ſmall quantity of ground Indigo, for a bluiſh caſt will enliven the Black, and help that deadneſs which a plain Black always carries with it.

BROWNS.

Firſt Brown. Take for a light Brown ſome Fuller's Earth; grind it well with Water, and mix with it ſome ground Chalk, or White-lead, to make it into different Colours, that is, lighter or darker as you think proper, mix this up with pale Ale-wort boiled thick, and have at leaſt four Sorts of it.

Second Brown. Take ſome Spaniſh Brown ground very well, and mix it with ſome Fuller's Earth to make it lighter, becauſe the Spaniſh Brown is a dark Colour of itſelf; and having made this mixture, you may put a little Chalk to ſome of it, or White-lead ground in different proportions, to make it of different Shades. Theſe being by far the lighter Browns, mix them ſeverally in Paſtes with a light Size of Fiſh-glue, or Iſinglaſs and Water; and mix ſome of them with pale Ale-wort boiled thin, or thick Water-gruel boiled with Gum-dragon; then make them into Crayons.

Third Brown. Take Spaniſh Brown ground fine, and ſome Indian Red; mix theſe well together, and to that put ſome pale Ale-wort, till it becomes a paſte. You may make ſome of this Colour lighter with Chalk, or White-lead ground; then roll it into Paſtils.

GREENS.

Firſt Green. Take ſome Verdigriſe, and boil it in ſharp Vinegar; when it boils, add a little Tartar powdered, which will ſo diſſolve the Verdigriſe, that the Liquor will be of a fine Colour; then ſet the Liquor in little Gallipots, expoſed to the Air, which will dry the Colour, and then it will diſſolve in common Water. This may be taken with as much warm Ale-wort as will cover it, and will diſſolve the Green; then make it into Paſtils, with ground White-chalk, as much as you think fit.

Second Green. Take diſtilled Verdigriſe ground with Vinegar on a Marble, waſh it well with Water; the manner of which is, to throw the Verdigriſe into Water, and in half a Minute to pour off the Water into a Cup, and let it ſettle; then pour the Water from it, and waſh it again in the ſame way, and when this is dry, make it into Paſtils with Ale-wort.

Third Green. Take Verdigriſe prepared as before, finely powdered, and mix it with a little Pruſſian Blue in ſeveral proportions. In the lighteſt Sorts put a little White, or the brighteſt Yellow well ground, to make varieties of Colours; mix all theſe with pale Ale-wort boiled to a thickneſs.

Fourth Green. Take Indigo well ground, and ſome Engliſh Pink; mix theſe well together upon a Marble, and when they are well powdered, make them into a paſte, and roll them up with a ſoft Size and Oil into the ſhape of Crayons, or with pale Ale-wort or thick Water-gruel; but when you uſe Water-gruel, it muſt be ſtrained and boiled with ſome Gum-dragon.

Fifth Green. Take Blue-bice ground fine, add to it ſome Dutch Pink well ground; mix them in parcels, and prepare them in Shades to one another; then make them into Paſtes, and roll them into Paſtils.

The Liquid you uſe to make them into Paſtils, muſt be Ale-wort boiled a little thick.

Sixth Green. Take Rock-Indigo ground very fine with Water on a Marble, and when it is dry beat it fine again; then divide it into Parcels on the Marble, and to ſome of them put a little Flower of Brimſtone in greater or leſſer quantities; to others Flower of Brimſtone and Dutch Pink mixed, ſo that you may have a variety of Colours. When you have thus made the different Shades you intend, then make them into paſtes with Ale-wort thickened by boiling with white Glover's Shreds of Leather, or a little Gum-dragon; and roll them into Crayons.

Seventh Green. Grind Rock-Indigo with Water, and put to it in ſeveral parcels, as much Dutch Pink as you think fit, to make your Greens of various Shades; when theſe are well mixed, put to them ſome Ale-wort thickened by boiling, with which make them into paſtes; then roll them into Paſtils.

The Reaſon why theſe Paſtils are better than thoſe which in common are bought at Shops, is becauſe they are generally made too ſtiff with Gums, and ſo will hardly touch the paper; all theſe will work freely, and expreſs the ſeveral Colours you deſire.

The Reaſons why you are to make five or ſix Shades of each Colour is, becauſe we cannot mix any when we uſe them ; whereas in Oil-painting, and Painting in Water-colours, we can make what Mixtures we pleaſe in an inſtant: And when we are about any Painting or Drawing in Crayons, which happens to have a great Variety of Colours in it, we ought to have every ſort of Colour that can be thought on.

Theſe Colours ſhould be kept in a Box partitioned, every ſort by itſelf, *viz.*

The White.

Yellows. Lay the brighteſt Sorts in one, and the deeper Sorts in another, till you come to the Orange-colours.

Orange-colours. The lighter Sorts in one apartment, and the deeper in another.

Reds. The paler Sorts, or Fleſh-colours, in one apartment, the brighter Reds in another, the ſtronger Reds in another, and the deepeſt Reds in another ; every one with its proper Shades, till we come towards the Purple.

Purples. The paler Sorts, inclining to Red in one apartment ; the next Sorts, more inclining to Blue, in another, with their Shades; and thoſe which are next to Blue, with their Shades, in a part by themſelves.

Blues ſhould follow the Purples; put the lighteſt in the firſt apartment, the next degree in another, a third into another, and the fourth to the laſt into others: But the Pruſſian Blue keep quite by itſelf, and its mixtures by themſelves; it ſerves very well in this way to ſupply the place of Ultramarine, and it is much cheaper. And beſides, in this way of Crayon-drawing, the preparation of Pruſſian blue does very well anſwer the ſame End, though that Colour will not do in Water-colours, nor even laſt in Oil-colours, if it comes to be expoſed to the Weather: for in either caſe it changes to a dirty Yellow-colour, but it is found that the Crayons hold by being embodied as is directed above.

Greens ſhould be divided into three or four ſorts, and with their Shades be laid in ſeveral apartments.

Browns ſhould be likewiſe laid in three or four parcels with their proper Shades, and be laid each in an apartment of one great Box, and the Painter ſhould never be without Crayons of Charcoal in another caſe. With all theſe he will be completely furniſhed, and when he goes out to take any View, he ſhould have one of every ſort divided after the foregoing manner to carry in his pocket.

The paper which ſhould be uſed on this Occaſion is rough Venice-paper, almoſt like our

whited

whited brown Paper, which the ſtiffer it is the better; and that ſort of it which is called Cap paper is by Experience found to be the beſt, becauſe upon ſuch the Colours muſt eaſily diſtribute themſelves. By this means every one may take Figures in their proper Colours, as they naturally appear to the Eye, becauſe he may match the Colours as they appear, with the Crayons he has got by him; and as the Crayons are dry they will not alter their Colour: but the wetted Colours will appear deeper when they are wet than when dry, which is apt to deceive the Eye of a Beginner.

Inſtructions for the uſe of CRAYONS.

WHEN you uſe your Crayons, remember that you point them from the Bottom upwards, and that you do not make the points too ſharp, unleſs in the White-chalk, the Red-oker, and the Charcoal.

A good pretty ſort of Drawing may be made on Blue-paper with only Chalk and Charcoal; the ſtrong Lights and the dark Shades make a fine Contraſt, and a pleaſant Appearance in a Drawing.

For the principles of Drawing, and the Directions neceſſary for attaining that uſeful Art, together with ſome farther Inſtructions on the

Doctrine of Colours of all Sorts uſed in Painting, we would recommend to the Reader a careful peruſal of *The Art of Drawing and Painting in Water-colours*, already referred to.

CHAP. III.

The Method of ETCHING.

ETching is a manner of Engraving on Copper, wherein the Lines or Strokes, inſtead of being cut with a Tool or Graver, are eaten in with Aqua-fortis.

Etching has ſeveral Advantages over Graving, firſt, as being done with more Eaſe and Expedition; ſecondly, as requiring fewer Inſtruments; and thirdly, as repreſenting curious kinds of Subjects, better and more agreeable to Nature, as Landſkips, Ruins, Grounds, and ſmall, faint, looſe, remote Objects, as Buildings, *&c.*

Of the proper Inſtruments, Materials, and Method of preparing theſe Materials, uſed in ETCHING.

THE principal Inſtruments for Etching, are the Etching-needles, the Oil-ſtone, Bruſh-pencils, the Burniſher, the Scraper, the Compaſſes, the Ruler, the Stift, and the Frame and Trough: the Materials are the hard and ſoft Varniſh, prepared Oil, and Aqua-fortis.

The Needles are to be choſen of ſeveral Sizes, of a fine Grain, and ſuch as will break without bending. Theſe are to be fixed in round Sticks, of firm Wood, about ſix Inches in length, and of the thickneſs of a large Gooſe-quill: they are to ſtand out of the Sticks about a quarter of an Inch, or ſomething better. Of theſe you ſhould have twenty at leaſt, which may be fixed in ſuch Sticks as to have a Pencil at the other End.

The Uſe of the Oil-ſtone is for whetting the Needles, which, if you would have the points round, muſt be whetted ſhort upon the Stone, by turning them round; and if you would have them ſloping, they are firſt to be blunted upon the Oil-ſtone, and then whetted, ſloping on one ſide only, till they come to a ſhort and roundiſh Oval.

The Bruſh-pencil is to cleanſe the Work, wipe off Duſt, and to ſtrike the Colours even over the Ground or Varniſh, when laid upon the Plate.

The Burniſher is a well hardened piece of Steel, ſomewhat roundiſh at the End, for ſmoothing and giving a Luſtre to the plate, *&c.*

The Scraper is one of the Inſtruments fitted for clearing the plate of all deeper Scratches or Strokes which the Burniſher will not take away.

The chief Uſe of the Compaſſes is in meaſuring Diſtances, or ſtriking Circles, or ſome part or portion of them, where you would have your Work to be exact.

The Ruler is uſed chiefly in drawing all the ſtraight Hatches or Lines of the Deſign upon the plate; or to mark out Diſtances upon ſtraight Lines.

The Stift is uſed for drawing through all the outmoſt Lines or Circumferences of the Print, Pattern, or Drawing, which is etching after.

The Frame is an entire Board, about the Top and Sides whereof is faſtened a Ledge about two Inches broad, to keep the Aqua-fortis from running off from the Sides, when it is poured on: the lower end of this Board is to be placed in the Trough, and to lean ſloping againſt a Wall, or ſome other thing, in which are to be placed ſix ſeveral pegs of Wood to reſt the plate upon.

The Trough is made of a fine firm piece of Elm or Oak, ſet upon four Legs, the hollow whereof is to be four Inches wide, and of ſuch a Length as may be fit for uſe. The hollow muſt be ſomething deeper in the middle than elſewhere, that the Water running thither may fall through a Hole (made there for that purpoſe) into an earthen pan well leaded. The inſide of this

Board and Trough muſt be covered with a thick Oil-colour, to hinder the Aqua-fortis from eating or rotting the Board.

The hard Varniſh for etching is made as follows: Take Burgundy or Greek Pitch, ten Ounces; of Colophony or Roſin, the ſame Quantity; of Nut-oil, eight Ounces; melt the Pitch or Roſin in an earthen Pan over a ſlow Fire; then put in the Oil, and let them boil for the Space of half an Hour: after this ſet it on a ſlower Fire, and let it cool a little till it appear like a gluey Syrup: then cool it a little more; ſtrain it and when it is almoſt cold, put it into a glazed pot for uſe. This will keep good for upwards of ſeven Years.

To make the ſoft Varniſh for etching, take of Virgin-wax ſix Ounces; Maſtich in Drops, four Ounces; Aſphaltum, two Ounces: grind the Maſtich and Aſphaltum, ſeparately, very fine; and ſift them through a very fine Hair-ſieve: then melt the Wax in an earthen pot, and ſtrew in the Maſtich and Aſphaltum, ſtirring them upon the Fire, till they are well diſſolved and mixed, which will be in about half an Hour: then let it cool a little and pour it into a Baſon of fair Water, but ſuffer not the Dregs to go in: afterwards having wetted your Hands take it out of the Water, and make it up into Rolls before it is cold.

If it be for a red Ground, take Red-lead, grind it very well, and temper it with Varniſh; if for a white Ground, take Roſin, four Ounces; Wax, two Ounces; melt them together, adding Venetian Cerufs, finely ground, four Drams; and if for a black Ground, take Aſphaltum, two Ounces; Bees-wax, one Ounce; melt them together, and while they are warm lay the Mixture thinly on with a Lawn-rag.

To make the prepared Oil, heat Olive oil in an earthen pan, and putting to it as much Sheep-ſuet as that being dropt upon a cold thing, the matter will be a little hardened and firm; let theſe boil together for the Space of an Hour, till they become of a reddiſh Colour, leſt they ſhould ſeparate when they come to be uſed.

To make the Aqua-fortis: Take of diſtilled White-wine Vinegar, one Quart; of Sal-armoniac and Bay-ſalt, each four Ounces; of Verdigriſe, almoſt three Ounces; put all theſe together into a pretty large earthen Veſſel well glazed, and covering the Pot cloſe, ſet it over a quick Fire, taking care that the mixture does not boil over; give it as ſpeedily as you can two or three great warms, and no more; when it is ready to boil, uncover the Pot, and ſtir it now and then with a Bit of Stick, taking care that it does not boil over: when it has boiled take it off and ſet it by to cool, keeping it ſtill cloſe covered, and when it is cold, put it into a Glaſs-bottle with a Glaſs-ſtopper.

If it proves too ſtrong in Etching, it may be weakened with a glaſs or two of the ſame Vinegar you made it of.

The Method of preparing the PLATE *and uſing the* VARNISH *for Etching.*

TAKE a Copper-plate about the Size of the Work to be Etched; hammer it very even and ſmooth; then take a Pumice-ſtone, free from Gravel, and thereby rub it with a little Water; and afterwards, with a few Drops of Olive-oil, rub it well with your Burniſher, and rub that with a piece of Charcoal dipped in Water. Then with a Roller made of Black Felt, Caſtor, or Beaver-hat dipped in Olive-oil, rub it well for an Hour or more, till the Plate is glazed and ſufficiently poliſhed.

The Plate being poliſhed, heat it over a Chafing-diſh of Coals, and with a little Stick take ſome of the firſt Varniſh, and put a Drop of it on the tip of your Finger, with which touch the plate lightly and at equal Diſtances; laying on the Varniſh equally, and heating the Plate again as it grows cold, preſerving it carefully from gathering any Duſt or Filth. Then, with the ball of your Thumb, daub it upon the plate, ſtill wiping your Hand over all, till you make it ſmooth and equal, in which caſe great care is to be taken that the Varniſh is not too thick, nor your Hand ſweaty.

This being done, take a great lighted Candle, that burns clear with a ſhort Snuff, and placing the Corner of the plate againſt the Wall, and holding the varniſhed Side of the plate downwards over the Candle as cloſe as you can, not to touch the Varniſh, guide the Flame all over the plate, till it is all perfectly blacked, and preſerve it from Duſt and Filth till it is dry.

Hang the varniſhed plate to dry over a charcoal Fire, with the varniſhed Side upwards, which will ſmoke: when the Smoke abates, take away the plate, and with a pointed Stick ſcratch the near ſide of it, and if the Varniſh comes off eaſily, hang it over the Fire again for a little while, till the Varniſh will not eaſily rub off; then take it from the Fire, and ſet it by to cool.

If the Varniſh ſhould be too hard, caſt cold Water on the backſide of the Plate.

The Method of uſing the ſoft Varniſh is as follows. Having made the plate ready as before, rub it well over with fine white Chalk ſcraped and a fine Rag, not touching it with your Fingers.

gers. Then lay the plate over a Chafing-diſh, and having tied up ſome of the Varniſh in a fine Rag, rub it up and down the Plate, ſo that as it melts, it be neither too thick nor too thin: then ſmooth it as well as you can all one way with a Duck's Feather; and afterwards croſſwiſe, till it lies ſmooth and even. But care muſt be taken that the plate be not too hot, for if it lies till the Ground ſmokes, the moiſture will be dried up, which will occaſion the Ground to break, or fly up and ſpoil the Work.

Then having ready ſome Ceruſs or White-lead, ground with Gum-water, ſo that it is of a convenient thickneſs for ſpreading on the Copper, ſtrike the Plate with it croſs over twice or thrice, till it is ſmooth, with a large Pencil or ſmall Bruſh made of a Squirrel's Tail, and after this ſet it by till it dries.

General Directions for ETCHING.

THE Method of Etching is as follows. The plate being covered over with a peculiar Ground or Varniſh, as already directed, and that ſide blackened with the Smoke of a Candle, the Back of the Deſign or Draught is laid over the Varniſh, being firſt rubbed with Red-chalk: then the Deſign being laid on is to be transferred upon the varniſhed ſide of the plate. This is done by tracing over all the Lines and Strokes of the

Draught with a Needle or Point, not very ſharp, which, preſſing the Paper cloſe down to the Ground, cauſes the Wax to lay hold of the Red-chalk, and thus brings off with it the Marks of the ſeveral Lines, ſo that at Length it ſhews a Copy of the whole Deſign in all its correctneſs.

In the mean time, it is neceſſary to obſerve, that ſuch parts of the Plate as you do not work upon, is to be covered with a Sheet of fine white paper, and a Sheet of brown paper over that; upon this you may reſt your Hand to keep it from the Varniſh. If you make uſe of a Ruler lay ſome part of it upon the paper, that it may not rub off the Varniſh; and take an eſpecial care that no Duſt or Filth get in between the paper and the Varniſh, becauſe that would hurt it.

The Draught or Deſign being thus chalked, the Etcher next proceeds to draw the ſeveral Lines and Contours with a pointed Tool through the Grounds upon the Copper. In doing this, he makes uſe of points of various Sizes, and preſſes them on more ſtrongly or lightly according as the ſeveral parts of the Figures, *&c.* require more or leſs ſtrength or boldneſs.

This being done, a Rim or Border of Wax is raiſed round the Circumference of the Plate, to keep in the Aqua-fortis, and prevent it from running off at the Edges; and then it is poured on the plate ſo prepared. The Ground or Varniſh with which the plate is covered, defends it every where from the corroſive Quality of the Aqua-fortis, except in thoſe Lines or Hatches cut thro the Ground with the Points, which lying open, the Water paſſes through them into the Copper, and eats into it the depth required, which being done it is poured off again.

It is to be obſerved, that the Aqua-fortis muſt not continue equally long, or be poured on equally over all the parts of the Deſign; the remote parts muſt firſt be eaten more ſlightly than thoſe nearer to the View. For effecting this, a compoſition of Oil and Greaſe with which they cover all the parts that are to be bitten no farther, is made uſe of; or elſe this Compoſition is at firſt laid on as a defenſative, and taken off again when they find it proper. In a word, they are every now and then covering or uncovering one or another part of the Deſign as occaſion requires.

The Management of the Aqua-fortis is the principal Matter in the whole Art of Etching, and that on which the Effect of the whole chiefly depends. The Workman muſt be obſervant as to the Ground, that it does not fail or give way in any part to the Aqua-fortis; and if in any place it does, to ſtop up that with common Varniſh. It muſt be alſo obſerved, that a freſh Dip of Aqua-fortis muſt never be given without firſt waſhing out the plate in fair Water, and drying it at the Fire.

When the Aqua-fortis has performed its part, the Ground muſt be taken off, and the Plate waſhed and dried; after which the Artiſt muſt examine it with his Graver in his Hand, to touch it up and heighten it where the Aqua-fortis, *&c.* has miſſed.

Particular Directions for ETCHING.

In making Lines or Hatches, as there muſt be ſome bigger and ſome leſs, ſome ſtraight and ſome crooked, you muſt uſe ſeveral Sorts of Needles, bigger or leſs, as the Work requires. The large Lines are made by leaning hard on the Needle, the Point being ſhort and thick; (but a round Point will not cut the Varniſh clear) or by making divers Lines or Hatches very cloſe to one another, and then paſſing over them again with a thicker Needle; or by making them with a pretty large Needle and letting the Aqua-fortis be the longer thereon.

If your Lines or Hatches ſhould be of an equal thickneſs from end to end, lean on the Needle with an equal force; leaning lightly where you would have the Lines or Strokes fine or ſmall;

and heavier where you would have them appear deep or large. If the Lines are too ſmall, paſs over them again with a ſhort but round point, of ſuch a bigneſs as you would have the Line of, leaning ſtrongly where you would have it deep.

The manner of holding the Needle with oval points, which is moſt proper for making large and deep Strokes, much reſembles that of a Pen; only the flat ſide whetted is uſually held next the Thumb; yet it may be uſed with the Face of the Oval turned towards the Side of the little Finger.

If you would end with a fine Stroke, you ſhould draw it with a fine Needle; and in uſing the oval points, hold them as upright and ſtraight in your Hand as you can, ſtriking your Strokes firmly and freely, for that will add much to their beauty and clearneſs.

In etching Landſkips, you muſt uſe ſlender points, for faint Strokes to thoſe places at the greateſt diſtance from View, as alſo thoſe neareſt the Light; and you muſt be careful, while at work, to bruſh off all the Duſt worked off with the Needles.

It is neceſſary to obſerve that you ought to be ſo far maſter of the Art of Drawing as to be able to copy any Print or Painting exactly, and to draw after good Heads of Plaſter or Figures, according to your own Fancy, and to ſhadow every thing exactly according to the Art: and therefore, when you imitate Plaſter, be ſure to take the true Out-lines or Circumferences; and taking notice how the Shadow falls, to do it very faint, as ſoft as the Deſign requires. Therefore it is convenient that you be able to hatch with the Pen exactly, after good Copies; and when you can do that, to draw after Plaſter, and then to draw from the Life.

In order to take the Out-lines in any Drawing or Print upon the Ground of the Plate, you muſt ſcrape a little White-lead on the backſide: then take a Feather, and rub it over every where alike, and ſhake off that which remains looſe.

Having done this, lay the print on the Plate, over that ſide where the Lead is, and faſten the four Corners of it to the plate, with a little ſoft Wax: then take the Stift and draw upon the Print all the outmoſt Lines or Circumferences exactly. When you have done this, take off the print from the Plate, and all the ſame Out-lines and Circumferences which you drew upon the Print with a Stift, will exactly be found upon the Ground.

Then you muſt obſerve exactly how your Original or Pattern is ſhadowed, how cloſe the Hatches are joined, how they are laid, and which way the Light falls or comes in; this muſt be made to fall one way, and if the Light falls ſideways in the print, you muſt hatch that ſide darkeſt which is fartheſt from the Light; and ſo place the Lights altogether on one ſide, and not confuſedly, part on one ſide, and part on another.

Take heed how cloſe all the Hatches join, how they incline, and which way they twiſt and wind: this follow as exactly as you can; but before you begin to hatch or ſhadow, you muſt not fail to draw all the Out-lines with a Needle upon the Ground as artificially as you can, and ſhadow it with your different Needles according to the Original.

In Landſkips, that part next the Eye, as was already obſerved, is to be hatched darkeſt, and the reſt is to decline in its Shadows by degrees the farther it is off from view. The ſame Method is to be obſerved in etching a Sky, for that which is neareſt to the Eye muſt be ſhadowed darkeſt, but in general as ſoft and faint as poſſible, loſing itſelf gradually, as directed before; and by how much nearer the Sky comes to the Ground, by ſo much the more looſe and faint muſt it be made to appear, and where they both meet as it were together, the Sky muſt be quite loſt.

In etching Letters, ſcrew the Copper-plate (after it has been prepared for etching in the manner already directed) in a Hand-vice, then hold it over a Charcoal-fire till it be warm; rub a Piece of Virgin-wax all over the Plate, ſpreading it very even with a Feather, and then letting it cool. The Letters being written on Paper with ungummed Ink made with Vermilion, lay the written Side downwards upon the waxed Plate, and faſten the four Corners with a little ſoft Wax, placing the Writing ſo exactly that the Lines may run ſtraight. Then rub the Backſide of the Paper all over with a Dog's-tooth, taking care not to miſs any part thereof, and taking the Paper off the Plate, you will find all the Letters written on the Paper left exactly on the Wax. Then draw all the Letters through the Wax on the Plate with a Stift, and afterwards clean the Work from the looſe Wax with a Linen-rag or Pencil-bruſh; and laſtly pouring on the Aqua-fortis the Letters will be etched; All the former Operations being performed, waſh the Plate with fair Water, and ſet it wet upon the Fire till the Mixture be well melted; then wipe it very clean on both Sides with a Linen-cloth, till it is thoroughly clear of all the Mixture. In the next place take Willow-charcoal, and pulling off the Rind, put fair Water on the Plate, and rub it with the Charcoal, as if you were to poliſh it, and by this Operation you will get off the Varniſh; only you muſt remember that the Coal is to be free of all ſorts of knots and roughneſs, and that no ſand or filth fall on the Plate. After this, adding two third Parts of fair Water to one third part of common Aquafortis, dip a Linen-rag in it, which by rubbing the Plate all over will reſtore it to its former beauty. However, it is neceſſary that the Plate be wiped after this with dry Linen-rags to take off the ſaid Water; this is done by holding it a little before the Fire, putting on a little Olive-oil, and, with the Fur of an old Beaver-hat rolled up, rubbing the Plate all over before it is wiped with the dry Cloth.

Laſtly, If any Places require to be touched with the Graver, as it frequently happens, eſpecially where it is to be very deep or black, carefully correct them; and then the Plate is fit to be carried to the Rolling-preſs.

CHAP IV.

Of JAPAN *and* INDIAN VARNISHES.

Of Japanning of Metals.

IN japanning of Metals it is to be obſerved, that Steel or Iron may be japanned or varniſhed with any Colours: alſo that Part of the Metal deſigned for japanning in Colours ſhould not be poliſhed, and thoſe Parts which are to be poliſhed ought to be done before the Painting, otherwiſe part of the Colour is liable to break off in the Poliſhing.

The manner of japanning Metals is as follows. Take any Colour you think proper, and grinding it well with Water on a Stone, by means of a Muller, let it dry; and grind it afterwards in a Mortar, ſifting it, if there is any occaſion: then inſtead of Oil, mix it with white Varniſh, and lay it by for uſe.

The Whites are Ceruſs or Fleſh-white.

The Yellows are Yellow-oker, Engliſh Pink, and Dutch Pink.

The Reds are Vermilion, Red-lead, and Lake.

The Blues are Bice and Indigo.

The Blacks are Lamp-black, and Ivory or Bone-black.

The Greens are Verdigriſe ground, or Verditer and Dutch Pink ground together.

The Browns are Fuller's earth and Spaniſh Brown.

And the Purples may be made between Red and Blue, till you perceive they are to your mind.

The manner of japanning Iron Snuff-Boxes, &c. ſo as to look like China gilt about the Edges, is as follows.

TAKE White-lead ground with Water, and drying it, beat it again to fine Powder, and mix it with Size. Let this preparation be laid equally on the Top and Bottom of your Iron-plates or Snuff-boxes, and afterwards ſuffer them to dry well. Then, about the Rims and Edges of the Box, lay ſome Yellow-oker with Size. and over that ſome Gold-ſize; and when this is well dried, lay on the Gold-ſize mentioned in the Colour-box; and this being near dry, lay on the Gold-leaf, that it may ſtick the better. Remember to have a Cuſhion of woollen Cloth to cut your Gold-leaf upon, that the Pieces of Gold may be exactly of the Size and Shape you require.

Then take your Leaf-gold on ſome Cotton, lay it on the Part done with Gold-ſize, and laying it ſmooth, let all dry: this being done, paint whatever Figures you think proper on the upper and under Side of your Box, *&c.* upon the white Ground principally with Blue-bice mixed with white Varniſh, and ſhaded with Indigo; and when this is dry, waſh the white Part with white Varniſh, and the gilded Part with the gold Varniſh.

Method of making White or Amber-Varniſh, from a Manuſcript of Mr. Boyle.

MELT about two Drams of White-reſin in a clean glazed Pipkin, putting to it, by little and little, an Ounce of very white Amber; beat it to a fine Powder, and ſtir it over a gentle Fire till it is diſſolved; then when you find it growing ſtiff, pour in now and then a little Oil of Turpentine,

tine, continuing to do ſo till the Amber is melted. In the mean time, be careful leſt it ſet fire to the Houſe, becauſe the very Vapours of the Oil of Turpentine will take fire by heat alone; and if it ſhould happen to take fire, your beſt way of extinguiſhing it is immediately to clap a flat Board or wet Blanket over the Pot, which by keeping the Air from it will either put it out, or ſuffocate it.

Therefore in making this Varniſh you are cautioned to melt the Reſin in a Glaſs of a Cylindric Figure, on a Bed of hot Sand, after the Glaſs has been well annealed or warmed by Degrees in the Sand; and under this you are to keep a very gentle Fire.

Having made your Varniſh, pour it into a coarſe linen Bag, and preſs it between two hot Boards of Oak or Iron, after which you may uſe it with any Colour, as well as to varniſh them over when they are painted.

After varniſhing your Snuff-Boxes, *&c.* with this white Varniſh, you may put them into a declining Oven, to dry, and harden the Varniſh.

But to cover Gold, you muſt uſe the following hard Varniſh, (taken alſo from a Manuſcript of Mr. *Boyle)* which will bear the Muffle, and may ſerve to lay over Braſs or any other Metal, that appears like Gold, as well as Gold itſelf, to keep it from turning black, as the Bath-metals and ſuch like are apt to do, when expoſed to the Air. It is to be made thus: Melt half an Ounce of Colophony in a glazed Veſſel: then ſtrew in by degrees an Ounce of powdered Amber, ſtirring it all the time, and when this begins to harden or reſiſt the Stick, put in a little Oil of Turpentine, which will immediately ſoften it; then ſprinkle in an Ounce of powdered gum Copal, every now and then pouring in ſome Oil of Turpentine; and ſtrain the Varniſh as already directed. The things done with this Varniſh muſt alſo be put in a declining Oven for three or four Days ſucceſſively; by which means it will reſiſt even Fire.

To japan Braſs, in the manner uſed to gild Braſs buttons, ſo as to make them look like Gold.

THIS may be uſed upon Leaf-gold, or upon what is called the German Leaf-gold: or upon Braſs and Bath metal, that is deſigned to imitate Gold, in the manner following.

Put a Pint of the Spirit of Wine into a retort Glaſs, and adding a quarter of an Ounce of Gamboge, half an Ounce of Lake, and half an Ounce of Gum-maſtic, ſet it in a ſand Heat, or near the Fire, or put the Body of the Retort frequently in warm Water for ſix Days together, ſhaking it twice or thrice a Day; then ſet it over a Pan of warm ſmall-coal Duſt, and having firſt well cleaned the Metal, do it over thinly with this Varniſh, and it will appear of the Colour of Gold, and will not rub off, after being well dried in a declining Oven.

This is a good Varniſh to mix with any Colours that incline to Red, as the white Varniſh is to mix with thoſe that are pale, or with any other ſort of Colours.

Of japanning on Wood or Paper, with Directions for making ſeveral ſorts of Japan Wares, either in Gold, Silver, or in Colours.

THE People of Japan have a Method of making Plates, Bowls, and other Veſſels, of Brown-paper, and ſometimes of fine Saw-duſt, which are very light and ſtrong, after they have been varniſhed.

The Method of making them is as follows: Boil a Quantity of Slips or Pieces of Brown-paper in common Water, maſhing it with a Stick, while boiling, till it turns almoſt to a Paſte; then take it out of the Water, and pound it in a Mortar, till it is reduced to Rags like thoſe pounded in the Trough of the Paper-mill. That done, take Gum-arabic, of which and common Water make a ſtrong Gum-water, a Quantity ſufficient to cover the Paper-paſte an Inch thick; put theſe together in a large glazed Pipkin, and let them boil, ſtirring them well together, till the Paper-paſte is impregnated with the Gum: then have a Mould ready to give the Paſte the Form or Shape you deſign it.

This Mould is made as follows. Suppoſe, for example, you deſign to make a Veſſel in the Form of a pewter or earthen Plate, procure a hard Piece of Wood turned on one ſide in the Form of the Plate, with a Hole or two made in the Middle quite through the Wood: then get another Piece of the like Wood, and much of the ſame Figure, and alike turned, but about the eight part of an Inch leſs than the former; and this laſt may have ſome little Ornament carved or engraven on the Wood. Oil theſe Moulds very well on the Sides that are turned, and continue to oil them till they are well ſoaked, by which time they will be fit for uſe.

Then take that Mould which has the Hole in it, and having oiled it again, ſet it even upon a ſtrong Table, and ſpread over it ſome of your Paſte, as equally as poſſible, ſo as to be every where a Quarter of an Inch thick: then oil the other upper Mould very well, and ſet it as exact as poſſible upon your Paſte, and preſſing it down very hard, and, ſetting a great weight on it, let it ſtand for twenty four Hours.

It may be obſerved, that the Hole at the Bottom of the Mould is for the Water to paſs thro' that is preſſed or ſqueezed out of the Paſte, and that the oiling the Mould is to prevent the gummed Paſte from ſticking to the Wood.

When the Paſte is dry, it will be as hard as a Board, and fit to lay a Ground upon, which Ground ſhould be made with ſtrong Size and Lamp-black: then let it ſtand to dry, leiſurely, and when it is thoroughly dry, mix Ivory-black finely ground with the following Varniſh.

To make the ſtrong Japan-varniſh.

TAKE an Ounce of Colophony, and having melted it in a glazed Pipkin, take three Ounces of Amber reduced to a fine Powder; this ſprinkle, by little and little, into the Pipkin, adding now and then ſome Spirit of Turpentine: when this is melted, throw in three Ounces of Sarcocolla finely powdered, ſtirring it all the while, and putting in frequently more Spirit of Turpentine, till all is melted: then pour it through a coarſe Hair-bag placed between two hot Boards, and preſs it gently till the clear part is received into a warm glazed Veſſel. Mix ground Ivory-black with this Varniſh; and having firſt warmed the Paper-plate, *&c.* paint it in a warm Room before the Fire, as equally as you can, and ſet it into a gentle

Oven; the next Day put it into a hotter one; and the third day into one ſtill hotter; and let it ſtand there till the Oven is quite cold; and then it will be fit for any uſe, either for containing Liquors cold or hot; this Varniſh will never change, nor the Veſſels break, without ſome great violence.

It is thought probable, that if the Moulds were caſt of any hard Metal, they might do better than thoſe turned in Wood.

To make theſe Veſſels of a Gold-colour.

PREPARE your Plates, Bowls, or any other Veſſel, according to the Method before directed; or it may be done in the manner following. Take fine Saw-duſt, and having dried it well, pour on it ſome Turpentine mixed with an equal quantity of Roſin, and half as much Bees-wax: mix them well, and put them to your dry Saw-duſt, ſtirring all together till the Mixture becomes as thick as a Paſte. Then take it off the Fire, and having warmed the Moulds, ſpread ſome of your mixture on that which has the Hole in the middle as equally as can be done, and preſs down the upper Mould upon it: then ſet it by, and letting it ſtand till it is cold, it will be fit for Painting.

When the Turpentine is melted, you may put in ſome Sarcocolla finely powdered, about the Quantity of half the Turpentine, ſtirring it well; and this will harden it. The Compoſition ought to be made in an open Air, becauſe being apt to take fire it may endanger the Houſe.

But whatever of the Mixtures is uſed, in order to make them look like Gold, let them be done over with Size, and when that begins to ſtick a little to the Fingers, lay on Leaf-gold either pure or of the German ſort; but it is to be obſerved, that the German Leaf-gold is apt to turn Green, as moſt of the Preparations of Braſs will do, ſuch as thoſe of Bath-metal and others of the like kind, which look like Gold, when they are freſh poliſhed or cleaned every Day, but being expoſed to the Air, will ſoon change to an ugly Colour: therefore Gold is rather to be choſen, as it is not only of a finer Colour, but by reaſon it never changes. And tho' the Leaf-gold is tender and may be ſubject to run off, yet the Varniſh with which it is covered will keep it bright and entire.

After the Gold has been laid on, and the Gold-ſize is dry, and the looſe flying Pieces bruſhed off, then lay on the following Varniſh to brighten the Gold, and preſerve it from rubbing.

Varniſh for Gold, or ſuch leaf of other Metal as imitates Gold.

MELT ſome Colophony: then put in two Ounces of Amber well pulverized, with ſome

Turpentine, as the Amber thickens, ſtirring it well: then add an Ounce of Gum-elemi well powdered, and ſome more Spirit of Turpentine; ſtill keeping the Liquor ſtirring, till it is all well mixed: but take care to uſe as little Spirit of Turpentine as you can, becauſe the thicker the Varniſh is, the harder will it be.

Let this Operation be performed over a Sand-heat in an open Glaſs, and ſtrain it as directed for the former Varniſh.

Uſe this Varniſh alone, firſt warming your Veſſels made of the Paper-paſte, and lay it on with a Painting-bruſh before the Fire; and afterwards harden it by degrees at three ſeveral times in Ovens; the firſt being of a ſlow Heat, the next a warmer Oven, and the third a very hot one: and theſe Veſſels will look like poliſhed Gold.

You muſt obſerve, that for thoſe Veſſels which are made with Saw-duſt and the Gums, you may uſe a Varniſh made of the ſame Ingredients as above, excepting only the Gum-elemi; and this will dry in the Sun, or in a very gentle warmth.

To make theſe paper, &c. Veſſels of a Red-colour with gilded Figures on them.

THE Veſſels being prepared as before directed, with brown Paper-paſte, after they are dried, &c. as directed for the firſt, mix ſome Vermilion with the Varniſh firſt directed, and uſe it warm; then ſtove it, or harden it by degrees in an Oven, and it will be extremely bright; or elſe lay on the firſt Ground with Size and Vermilion, and with Gum-arabic and Water ſtick on in proper Places ſome figures cut out of Prints, as little ſprigs of Flowers, or ſuch like; and when they are dry, do them over with Gold-ſize, and let them remain till it is a little ſticking to the touch. Then lay on the Gold, and let that be well cloſed to the Gold-ſize, and dried; then if you have a mind to ſhade any part of the Flower, trace over the ſhady Parts on the Leaf-gold with a fine Camel's Hair-pencil and ſome Ox-gall, and then paint upon that with deep Dutch Pink; and when that is dry, uſe the Varniſh in a warm Place, (*i. e.* that Varniſh directed for the covering of Gold) and when you have done, ſet it to harden by degrees in an Oven. This Varniſh will ſecure the Leaf-gold, or German metal from changing, by keeping the Air from it.

The Method of SILVERING *theſe Japan Veſſels.*

AFTER the Veſſels have been made, and are thoroughly dried, do them over with Size, and with ground Chalk or Whiting; let them ſtand by till they are very dry, and then paint them over again with the brighteſt Gold-ſize you can get, (for there is a great deal of difference in the Colour of it; ſome of it is almoſt white, and other yellow; the latter is proper for Gold, and the former for Silver.) When this ſize is almoſt dry, lay on the Leaf-ſilver, and cloſe it well to the Size, bruſhing off the looſe Parts, when it is dry, with ſome Cotton.

When you lay on your Leaf-ſilver or Gold keep it free from the Air, for the leaſt Motion of the Air will wrinkle the Leaves ſo as they will not lie ſmooth: then uſe the following Varniſh to cover the Silver.

To make the Varniſh to cover the Silver.

MELT ſome fine Turpentine in a well-glazed Pipkin: then take an Ounce and a half of white Amber well pulverized; put it by degrees into the Turpentine, ſtirring it well till the Amber is all diſſolved: then put in half an Ounce of Sarcocolla powdered, and half an Ounce of Gum-elemi well levigated, pouring in at times more of the Turpentine-ſpirit till all is diſſolved. Let it be done over a gentle Fire, and keep ſtirring the Mixture continually while it is on the Fire.

This Varniſh will be as white and ſtrong as the former, and being uſed warm, is as ſtrong as that laid on the Gold; and when it is afterwards hardened by degrees in an Oven, in the manner of the Gold-varniſh, the Veſſel will look like poliſhed Silver.

Varniſh in japanning of Wood, to mix with ſeveral Colours.

TO make a Varniſh to mix with Colours, diſſolve Spirit of Turpentine over the fire in a little gum Tacamahaca till it is a little thickend: uſe this with any Colour that has been well ground with Water, and, afterwards pulverized: your Work being done, varniſh over your Piece with that directed to colour Silver.

DIRECTIONS *for imitating China or Porcelain Ware on Tea-Tables, &c. upon Gold or Silver Grounds.*

PREPARE your Tea-tables, *&c.* as already directed: then making out your Deſigns upon them, paſte on ſome Paper in proper Places, and when your paper is dry, draw your Deſigns upon them, and paint them with Water-colour: then with a bruſh lay gold or ſilver Size on the other Part, and when that is almoſt dry, lay on ſome Gold or Silver leaf; and all being dry, varniſh over with the white Varniſh, if it be a ſilver Ground; or with the ſtrongeſt Varniſh, if it be a gold one; except only the Ovals or Circles, which muſt be done with the white Varniſh; being ſo tranſparent that all the Paintings will appear through it. If you lay on a gold Ground, or any other Colour darker than that, then let your Paintings be blue and white; or if it be ſilver or light Ground, then uſe the moſt fiery Colours in your Paintings.

The Method of GLAZING PRINTS *with white Varniſh, ſo as to bear Water and a Poliſh.*

THE beſt Method for this purpoſe is firſt to paſte your Print on a Board, or a Piece of Shock-cloth ſtrained on a Frame: to do this well, prepare ſome ſtiff ſtarch, and with a Sponge dipped in Water, or thin Starch, wet the Back of your Print; and if you deſign to lay it on a Board, dip a large Bruſh in the thick Starch, and bruſh it over the Board as even as poſſible; and let it dry, then a ſecond time repeat the ſame Operation, and continue it till the Veins or Grain of the Wood are quite filled. In the laſt Operation, when the Starch is juſt laid on, lay your wet Print upon it as even as poſſible; preſs it cloſe every where till it lies ſmooth, and ſo let it dry. In this Operation let your Hands be clean, to prevent ſoiling the Print, and in about twenty four Hours, it will be dry enough to varniſh over with the following one.

Take Iſinglaſs four Ounces, and pulling it into ſmall Pieces, boil it in a Quart of Brandy, or ſome other ſtrong Spirit, in a glazed Pipkin; and when, by taking out a little, you find it will make a ſtrong Glue, by being a little expoſed to the Air, it will anſwer the Purpoſe. Having made this Glue as ſtrong as you can, while it is hot waſh over the Print with it, by means of a Bruſh, as quick as poſſible, and let that ſtand for a Day or ſo: waſh it over again in the ſame manner, and let it dry well: afterwards bruſh it over at ſuch a Diſtance from the Fire that it may not be too hot, otherwiſe it will bliſter: do this alſo two or three times over, then ſet it up for a Day or two, and bruſh it over again with the Varniſh three or four times, and let it ſtand a Day or two. Afterwards varniſh it a third time, and in three or four Days poliſh it with a ſoft Linen-cloth, and ſome fine Tripoli-oil, rubbing it very gently till it remains as ſmooth as poſſible; and cleaning it with Flour and Oil, it will then appear as bright as Cryſtal; and if it ſhould at any time be ſoiled by Flies or the like, you may waſh it with a Sponge and Water, which will clean it.

The white Varniſh is made as follows. Take of the cleareſt and whiteſt Sort of gum Sandarach one Pound, gum Maſtich one Ounce, gum Sarcocolla one Ounce and a half, Venice Turpentine three Ounces, Benzoin half an Ounce, white Reſin half an Ounce, and Gum-animæ an Ounce and a half: then mix and diſſolve theſe different Ingredients in the following manner. Put the Sarcocolla and Reſin into a little more Spirits than will cover them, to diſſolve therein: then put the Gum-animæ, Benzoin, and Venice Turpentine into a Glaſs or glazed Veſſel, and pour on as much ſpirits as will ſerve to diſſolve them; and in a like manner diſpoſe of the Gum-maſtich and Sandarach in a ſeparate glazed Veſſel, and in another of the ſame ſort put the Gum-elemi, with ſpirits ſufficient to diſſolve it.

In this Proceſs let it be obſerved that the gums Animæ, Sarcocolla, and Benzoin, muſt be pulverized, while the Reſin need only be a little broken.

While theſe things are diſſolving for three or four Days, ſhake the Bottles twice or thrice a Day, after which put all the Mixtures together in a glazed Veſſel, ſtirring them well; and then ſtrain the Liquor and Gum gently, beginning with the latter, through a Linen-cloth, which will prevent any filth getting into the Varniſh. Afterwards put it into a Bottle, and letting it ſtand a Week before you uſe it, put off as much of the clear Part only as you may want for preſent uſe.

If you put your print upon Shock-cloth well ſtrained in a Frame, bruſh over the Cloth, with ſtrong Paſte made with Flower and Water, and immediately bruſh over the Back of your Print with well prepared Starch: then bruſhing the

Cloth over again with the ſame Starch, lay on your Print as ſmoothly and equally as poſſible. Let them remain thus in a dry, warm Place for a Day or two, and then varniſh your Print with the Glue made of Iſinglaſs, as already directed, and then with the white Varniſh.

With this Varniſh you may mix up any Colour that has been ground dry upon a Marble, and paint with it upon any Figure you have drawn, or upon any print you have paſted upon your Work: but the varniſhed Colours ſhould be chiefly put upon the ſhady Parts.

A varniſh of Seed-lacca is made as follows. Put a Quart of ſtrong Spirits into ſix Ounces of Seed-lacca into a large glaſs Veſſel, and ſhaking it often let the Mixture ſtand for two Days: then paſs the Liquor through a Flannel-bag or the like, and ſqueezing the Gums every now and then, till all is ſtrained and nothing but the dry Gum remains, put it into Bottles, keeping them cloſe ſtopped till you perceive all the thick Parts ſettle to the Bottom, which will be in three or four Days: then pour off the clear Liquor into another Bottle, and it will be fit for uſe.

Directions for colouring of Draughts, or Prints of Birds, Flowers, &c. in japanning.

IF the Prints or Drawings of Flowers be in black and white, and the centre of the Flower be riſing, then touch the Edges of the Lights with a thin Tincture of Gamboge, and lay on ſome Dutch Pink or Gall-ſtone over the Shades, ſo as to run into the Lights but a very little. This is to be done by reaſon that the Thrumbs in the middle of Flowers are generally yellow, but if they are of any other Colour, as blue, in proportion as they are lighter or darker, the Verges of the lighter ones are to be touched with a little ultramarine Blue, and over the Shades either ſome Saunders Blue to run a little into the Ultramarine, or elſe Indigo; and ſome of the white of the Print being left void of Colour, will then give Life and Spirit to the Colours ſo diſpoſed.

All the Flowers ſhould be tenderly touched in the light Parts, juſt to give a little Glare to the light Parts of the Colour you would give to the Flower-leaves: and if you paint from a natural Flower, you will preſently ſee that you muſt lay on the moſt ſhady Part ſuch a colour as will force the reſt to appear forward: however, you are not to daub over the Shades with too heavy a Colour: let it rather be ſuch if poſſible as may be tranſparent, and mix that into the light Colour that was laid on before. The Pencil, upon this occaſion, muſt be uſed lightly, with very little Gum-water in it, and before the Colours are quite dry.

In painting the Leaves of Plants and Herbs, regard muſt be had to the Colours of the Greens, that ſometimes being the chief diſtinguiſhing character. Of Greens, Verdigriſe is the lighteſt, therefore that Colour ſhould be touched into the light Parts of the Leaf, from the Place where the lighteſt Parts of the Shades end: and then on the ſhady Parts lay ſome Sap-green, ſo as to unite with the Verdigriſe-green; and if the natural Leaf be of a darkiſh Colour, touch the lighter Sides of the Leaves with a little Verdigriſe-green and Dutch yellow Pink mixed together, or with a Tincture of French Berries, but ſo as to let the Verdigriſe, ſhine more than the Pink.

The leaving the Lights, in colouring a Print, has two Advantages; *viz.* If the lights be left on this occaſion, the whiteneſs of the Paper ſerves inſtead of uſing white Paint, which is a heavy Colour, and would rather confound thoſe that have been preſcribed to be laid on, than do them any ſervice; but the Colours before directed, when there is no white laid on, will ſhine agreeably into the white of the Paper.

General Obſervations in regard to VARNISHING.

In varniſhing Wood, let it be very ſmooth, cloſe grained, free from greaſe, and rubbed with Ruſhes.

Lay on your Colours as ſmooth as poſſible, and if the Varniſh has any Bliſters in it, take them off by a Poliſh with Ruſhes.

In laying on the Varniſh keep your Work warm, but not too hot.

Begin in the middle, and ſtroke the Bruſh to the outſide; then to another extreme Part, and ſo on, till all is covered: for the Bruſh, were you to begin at the Edges, would leave Blots there, and make the work unequal.

In fine Works, uſe the fineſt Tripoli for poliſhing; do not finiſh your poliſhing, at one time, but after the firſt poliſhing, let it dry two or three Days, and poliſh again for the laſt time.

In the firſt poliſhing you may uſe a good deal of Tripoli, but in the laſt a very ſmall quantity will ſerve the purpoſe. Waſh off the Tripoli with a Sponge and Water; dry your Varniſh with a dry Linen-rag, and clean your Work with Oil, Whiting, and Lamp-black.

Directions for taking off any figure from China or Japan-ware, without any previous Knowledge in Drawing.

LAY a Piece of oiled Paper over the Figure you would copy, ſo as to hold the Piece ſteady, till you can trace out the Lines of the Figures:

then lay the oiled Paper on another Paper blacked on one ſide, and the blacked Side of that one on a clean Paper: this done, trace the Lines with a Pen, or blunted Point of a Needle, till the Lines are all impreſſed on the white Paper, and draw them over with a Black-lead Pencil; and mark the Shades where they ſeparate from the light Parts of the Colours, in the manner you ſee them painted on your Pattern. After this cut out your Figures cloſe to the Out-lines, and fix them upon your ground of Whiting and Size, or of Size with ground Chalk, thick gum Arabic and Water; and when they are quite dry paint them, the lighter Parts in Water-colours, and the ſhady Parts with Varniſh mixed with the darker Colours.

When theſe are dry, waſh all over with the white Varniſh before the Fire, but not ſo hot as to make the Varniſh riſe in Bliſters. When the Varniſh is dry, lacker it again with the ſame Varniſh, and repeat it a third time: then ſcrape ſome Tripoli very fine and with a ſoft rag dipt in Water, take up a little of the Tripoli at a time, and poliſh it by gentle rubbing till it is ſmooth: then waſh off the Tripoli, with a ſoft Sponge and Water; after which, with a fine dry Cloth, wipe off the Tripoli, and when that is dry clean it with Whiting and Oil, if it is a white Varniſh: or with Oil and Lamp-black, where the Varniſh is black.

But the common way of doing this is to cut out Prints, and then to paſte them on ſuch Parts as are thought proper, and afterwards to colour them with Water-colours, and varniſh them with white Varniſh. This is an eaſy method of Painting, on account that the Shades of the Print, when a tranſparent Colour is laid on, will give the Light and Shade to your purpoſe, without uſing a dark and light Colour.

A Method, from Mr. Boyle, *of caſting Amber in any Figure whatever, with Flies or any ſmall Animals in it, in imitation of thoſe valuable Pieces of Amber ſold at a high Price.*

MELT ſome Turpentine in a Glaſs with a ſtrong Sand-heat where the Figure may be raiſed at diſcretion. Then having ſome levigated Amber of the fineſt ſort, either white or yellow, ſprinkle it into the melted Turpentine, ſtirring it all the time with a Piece of Fir-wood, till you find no reſiſtance: afterwards, if you perceive the melting Mixture to reſiſt the Stick, drop in by degrees a little Venice-Turpentine, and keep it continually ſtirring, till all the powdered Amber is diſſolved, and is thick enough to pour into Moulds: then, when it turns cold, you will have whatever Figure you propoſe remaining as hard as the Amber itſelf, with all the ſame Qualities that Amber commonly has.

F I N I S.

BRITISH MUSEUM 31 DEC 33

Plate III.

Plate IV.